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Wind Distributions and Interlevel Correlations, Surface to 60 km

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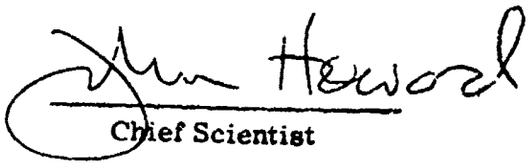

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Information is provided in this report on the interlevel correlations of the east/west and north/south wind components for altitudes between the surface and 60 km, with special emphasis on levels between 25 km and 60 km. Mean monthly wind speeds and day-to-day variations due to synoptic changes in weather patterns are included. Estimates are also given of the probability of extreme wind speeds at specific locations and altitudes up to 60 km. A statistical technique that can be used to obtain estimates of the integrated effect of wind on the trajectories and impact points of reentry vehicles is presented.

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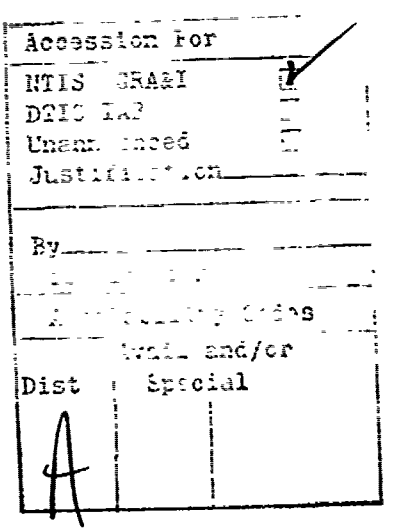
and an example of its application is given. These effects due to the winds must be considered, along with the density effects, in the design and operation of guidance systems for reentry vehicles and for targeting ballistic missiles.

Preface

The authors wish to thank Mr. Karekin Agazarian who developed the computer program for the computation of the statistical arrays. He provided them in "camera-ready" format, eliminating the time-consuming, manual preparation of Appendix A of this report. We also appreciate the work of Mr. Eugene A. Bertoni who prepared many of the figures for final drafting.



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1. INTRODUCTION

The winds that are encountered during passage through the atmosphere must be considered in the design and operation of missiles and other aerospace vehicles. In horizontal flight, information on the direction and speed of the wind at a specific altitude is needed to determine the range and ground speed of aircraft and the trajectory of constant level balloons. Variations in the vertical distribution of the winds are important factors in the launching as well as reentry of aerospace vehicles which rise or descend vertically through the atmosphere. During launch, wind shear resulting from changes in wind speed and direction with altitude can create a continuous torque on a vertically rising vehicle, forcing it off course and out of control. Deviations in the assumed vertical wind profile over a target or reentry point affect the range and cross-range of a ballistic missile. These effects must be considered, along with density effects,[1] in the design of guidance systems for reentry vehicles and for targeting ballistic missiles.

The data presented in this report indicate the frequency of extreme wind speeds at altitudes up to 60 km and provide information on the interlevel correlations of the east/west (zonal) and north/south (meridional) wind components for altitudes

(Received for publication 19 August 1980)

1. Cole, A.E., Kantor, A.J., and Bertoni, E.A. (1980) Interlevel Correlation of Temperature and Density, Surface to 60 km, AFGL-TR-80-0163.

between the surface and 60 km over specific locations. Special emphasis is placed on winds in the region between 25 and 60 km. A statistical technique which can be used to integrate the influence of the wind on the trajectories and impact points of reentry vehicles is presented and an example of its application is given in Appendix B. The technique can be also used for estimating the dispersion of balloons released from the surface and of chaff released in the upper atmosphere.

2. OBSERVATIONS AND LIMITATIONS

Wind data used in this report consist of rawinsonde and Meteorological Rocket Network (MRN) observations taken at the ten locations shown in Table 1.

Table 1. Observational Sites

Station	Location	Altitudes	Period of Record
Ascension Island	8°S, 14°W	Surface to 60 km	1969-1976
Kwajalein	9°N, 168°E	Surface to 60 km	1969-1976
Wallops Island	38°N, 75°W	Surface to 60 km	1969-1976
Churchill	59°N 94°W	Surface to 60 km	1969-1976
Fort Sherman	9°N, 80°W	26 to 60 km	1969-1976
Barking Sands	22°N, 160°W	26 to 60 km	1969-1976
Cape Kennedy	28°N, 80°W	26 to 60 km	1969-1976
White Sands	32°N, 106°W	26 to 60 km	1969-1976
Primrose Lake	55°N, 110°W	26 to 60 km	1969-1976
Poker Flats	64°N, 146°W	26 to 60 km	1969-1976

At the first four stations, rawinsonde and rocketsonde observations taken within a few hours of each other were combined to provide individual wind profiles from the surface to 60 km. Rocketsondes without accompanying rawinsondes were used at the six remaining sites to develop statistical properties of the wind distributions between 26 km and 60 km. Only observations that were taken at least 72 hr apart were used for this study in order to minimize the effects of persistence on the statistical properties of the wind. Durst[2] has shown that, at altitudes between 5 km and 20 km, the time rate of decay of the correlation coefficient (R) for wind follows the rule $R = e^{-aT}$, where "a" equals 6.9×10^{-6} sec^{-1} and T is measured in seconds.

2. Durst, B. A. (1954) Variation of Wind with Time and Distance, Geophysical Memoirs No. 93, British Meteorological Office.

The calculated correlation coefficient between observations taken three days apart is 0.17. This is in agreement with observed 72-hr correlations which are generally near zero (< 0.2).

The winds for altitudes up to 26 km, were extracted from rawinsonde observations. The Root Mean Square (RMS) observational errors in rawinsonde wind measurements using FPS-16, T-9, or similar radar for altitudes up to 26 km are 1 m sec^{-1} plus 2 percent of the vector wind.[3] For geometric altitudes between 26 km and 60 km, winds are obtained at 2-km intervals directly from MRN observations.[4] The estimated RMS observational errors in rocketsonde wind measurements at these levels are 2 m sec^{-1} plus 3 percent of the vector wind.[3]

Statistical arrays of the mean monthly winds for the midseason months of January, April, July, and October are presented in Appendix A for the ten locations shown in Table 1. They include mean monthly values of the zonal and meridional components at 2-km increments of altitude, standard deviations around the means, and interlevel correlation coefficients for each component for altitudes up to 60 km. The observed RMS variations (σ_o) around the monthly means include the true RMS variability (σ_t) due to changes in synoptic conditions and the RMS observation error (σ_e). If the true variability and observational errors are independent, the observed RMS variability is given by Eq. (1):

$$\sigma_o = \sqrt{\sigma_t^2 + \sigma_e^2}. \tag{1}$$

As a result, the effect of observational errors should be carefully evaluated to determine how much of the variability indicated by the uncorrected soundings is due to synoptic changes in weather patterns. These errors have a relatively small effect on the mean monthly wind components given in Appendix A because the RMS error of the mean monthly wind is equal to the RMS value of the error of an observation divided by the square root of the number of independent observations used in computing the monthly means.

3. TECHNIQUE

3.1 The Effect of Wind on Aerospace Vehicles

The average effect (E) of mean monthly winds on the range and cross range of a missile can be determined for a particular location by computer-simulated flights

3. Meteorological Group, Range Commanders Council (1977) Meteorological Data Error Estimates, Document 110-77, White Sands Missile Range, NM.

4. World Data Center A (1969-1976) Data Report Meteorological Rocket Network Firings, Ashville, NC.

through mean monthly component wind profiles if the appropriate influence coefficients for the missile at the various levels are given:

$$E = c_i v_i \tag{2}$$

where c_i is the influence coefficient at the ith level that describes the portion of the total response of a missile assignable to that level, and v_i represents the mean of the component wind speed for that level. The variation around this average effect, that is, the integrated standard deviation of the range due to day-to-day deviations from the mean monthly component wind profile, can be obtained from:

$$\sigma = \sqrt{\sum_{ij} c_i c_j R_{ij} \sigma_i \sigma_j} \tag{3}$$

where σ is the integrated standard deviation, c_i and c_j are the influence coefficients at levels i and j, σ_i and σ_j are the standard deviations of the component wind at levels i and j, and R_{ij} is the correlation coefficient between the component wind at level i with that at level j.[5] If it is assumed that the cross-component correlations are zero at any given level as well as between levels, the standard deviations for each component of the wind [Eq. (3)] can be readily combined and used to determine the probability of occurrence of deviations of any desired magnitude from the planned trajectory or, conversely, any probability of occurrence for the means, standard deviations, and correlation coefficients given in Appendix A. The arithmetic example in Appendix B illustrates how to use Eqs. (2) and (3) along with the statistical arrays in Appendix A to estimate the effect of the wind on the trajectory (and impact point) of a reentry vehicle.

3.2 Extreme Winds

Extreme wind speeds also can be estimated from the mean monthly wind components and standard deviations given in Appendix A. Based on the observations described in Section 2 above, mean monthly wind vectors and vector standard deviations were determined from the means and standard deviations of the zonal and meridional winds. Extreme scalar speeds were then calculated using the vector means and associated vector standard deviations and assuming a circular normal distribution.[6] A circular normal distribution requires an assumption that the zonal and meridional

5. Valley, S. L., Sci. Ed. (1965) Handbook of Geophysics and Space Environments, AFCRL.

6. Crutcher, H. L. (1959) Upper Wind Statistics Charts of the Northern Hemisphere, NAVAER 50-1C-535, Vol. I and II.

wind components are uncorrelated (independent) and that their standard deviations are equal. Since the standard deviations around the mean monthly zonal winds are generally somewhat larger than the standard deviations around the mean monthly meridional winds, an elliptical normal rather than a circular normal assumption applies. The effect of this inequality in the standard deviations can be estimated. For example, when the standard deviation of one component is twice that of the other, a circle of radius equal to one vector standard deviation contains about 65 percent of the total probability rather than 63.2 percent when the standard deviations are equal (circular normal).[7] Because of this small difference, a circular normal approximation has been used in this report as it provides reasonably accurate estimates and simplifies the calculations that must be made to determine extreme winds in the stratosphere and lower mesosphere.

4. WIND PROFILES

Profiles of mean zonal and meridional winds (m sec^{-1}) for each of the midseason months at Ascension Island, Wallops Island, and Churchill are plotted in Figures 1 and 2. These profiles describe variations in the vertical distributions of the monthly winds with geographic location. The most obvious feature of the zonal winds (Figure 1) in the stratosphere and lower mesosphere is that the strongest zonal winds occur near 60 km at Wallops Island in three of the four seasons. A west-to-east reversal in the zonal component above 20 km occurs between January and July at both Wallops Island and Churchill. In the troposphere the zonal winds generally increase with altitude from the surface, reaching a maximum near the tropopause where the mean zonal winds are westerly at all latitudes and seasons. This is the level where the wind shear is likely to be the most critical during the launching of missiles and other aerospace vehicles. The mean monthly meridional winds (Figure 2) are relatively light, less than 10 or 12 m sec^{-1} at all levels and locations except above 24 km at Wallops Island and Churchill in January.

Seasonal differences in the component wind profiles at each of the three stations are apparent in Figures 3 and 4. The middle and high latitude west-to-east reversal between winter and summer is clearly shown in Figure 3 for altitudes above 20 km at both Wallops Island and Churchill. Mean monthly differences between the winter westerlies and summer easterlies reach 136 m sec^{-1} at Wallops Island at 60 km. Somewhat larger differences occur between 60 and 70 km, the region of maximum winds in the mesosphere at midlatitude locations, and they gradually

7. Court, A. (1957) Maximum Variability Level of Winds, Scientific Report No. 2, Contract AF19(604)-2060, AFCRC TN-57-478.

decrease at altitudes above 70 km. Below 20 km monthly zonal winds at Wallops Island and Churchill are light to moderate westerly (< 34 m sec^{-1}) during all seasons. The mean meridional components (Figure 4) are generally small during most seasons. Southerly winds approach 18 m sec^{-1} only in January above 44 km at Wallops Island, and northerly winds reach about the same speed, also in January, between 32 and 44 km at Churchill.

5. VARIABILITY

Standard deviations of the day-to-day fluctuations around the mean monthly component winds for altitudes between the surface and 60 km are tabulated in Appendix A and are shown in Figures 5 and 6 for January, April, July, and October at Ascension Island, Wallops Island, and Churchill. These variations are a result of day-to-day changes in synoptic weather patterns. The variations of the zonal winds (Figure 5) are generally largest in January and at high latitudes, and smallest in July. Above the trosphere in July the variations are somewhat larger in the tropics than in middle and high latitudes. In addition, the seasonal differences between January and July increase with both latitude and altitude at levels above 20 km. The variations of the meridional winds (Figure 6) display similar characteristics, but are generally somewhat smaller above the troposphere than variations of the zonal winds.

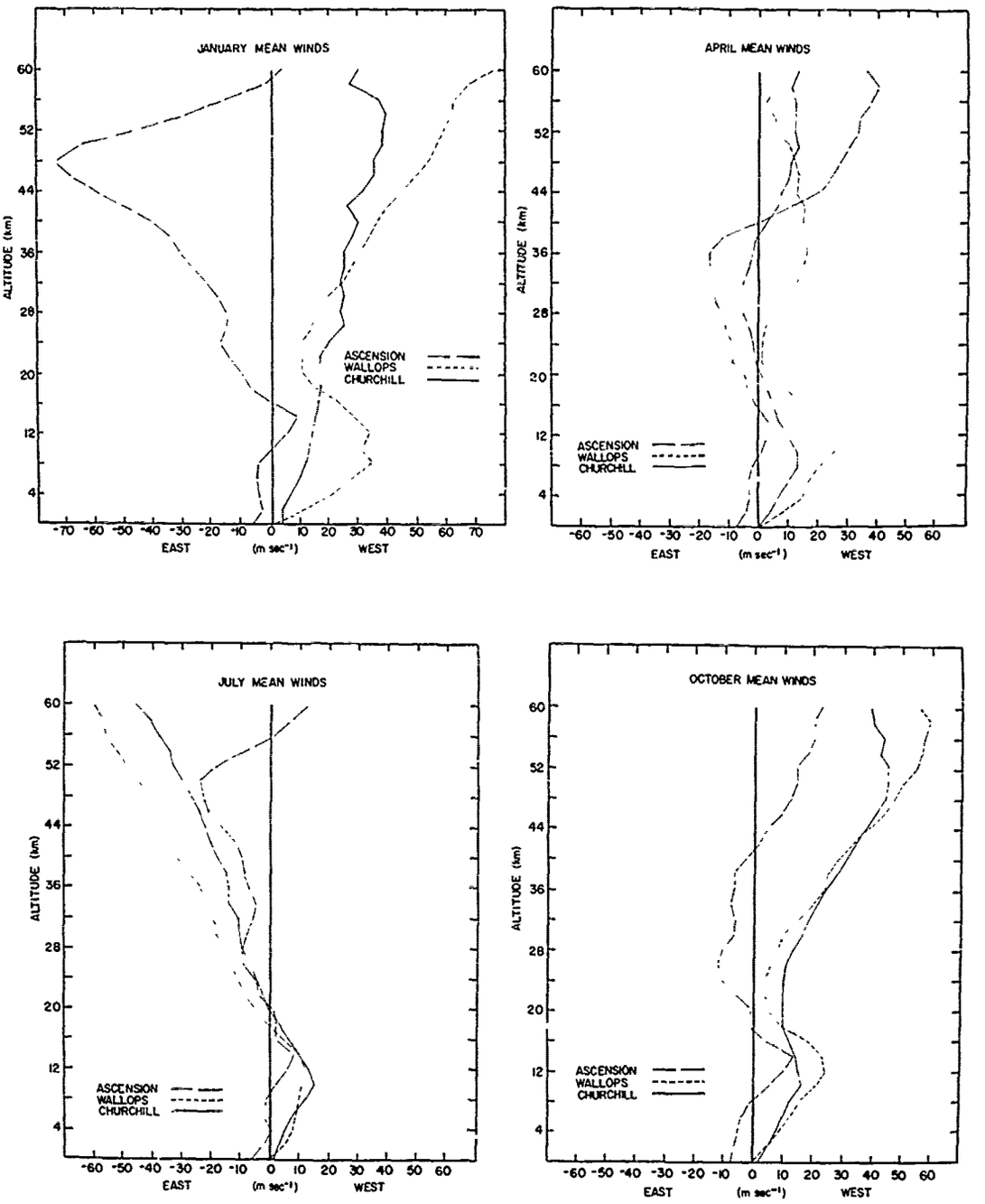

Figure 1. Latitudinal Effects on the Zonal Wind Profiles for the Midseason Months at Ascension Island, Wallops Island, and Churchill

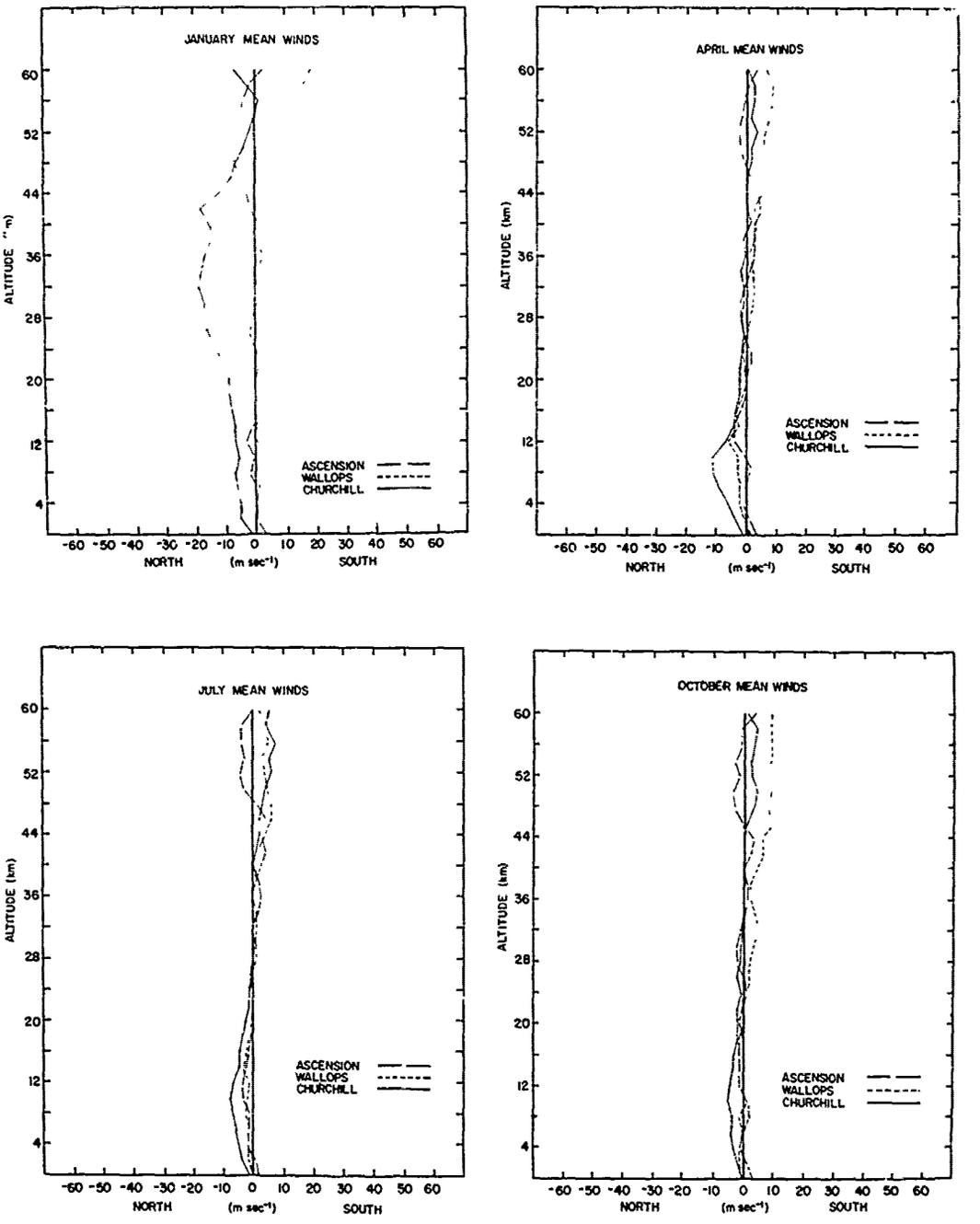

Figure 2. Latitudinal Effects on the Meridional Wind Profiles for the Midseason Months at Ascension Island, Wallops Island, and Churchill

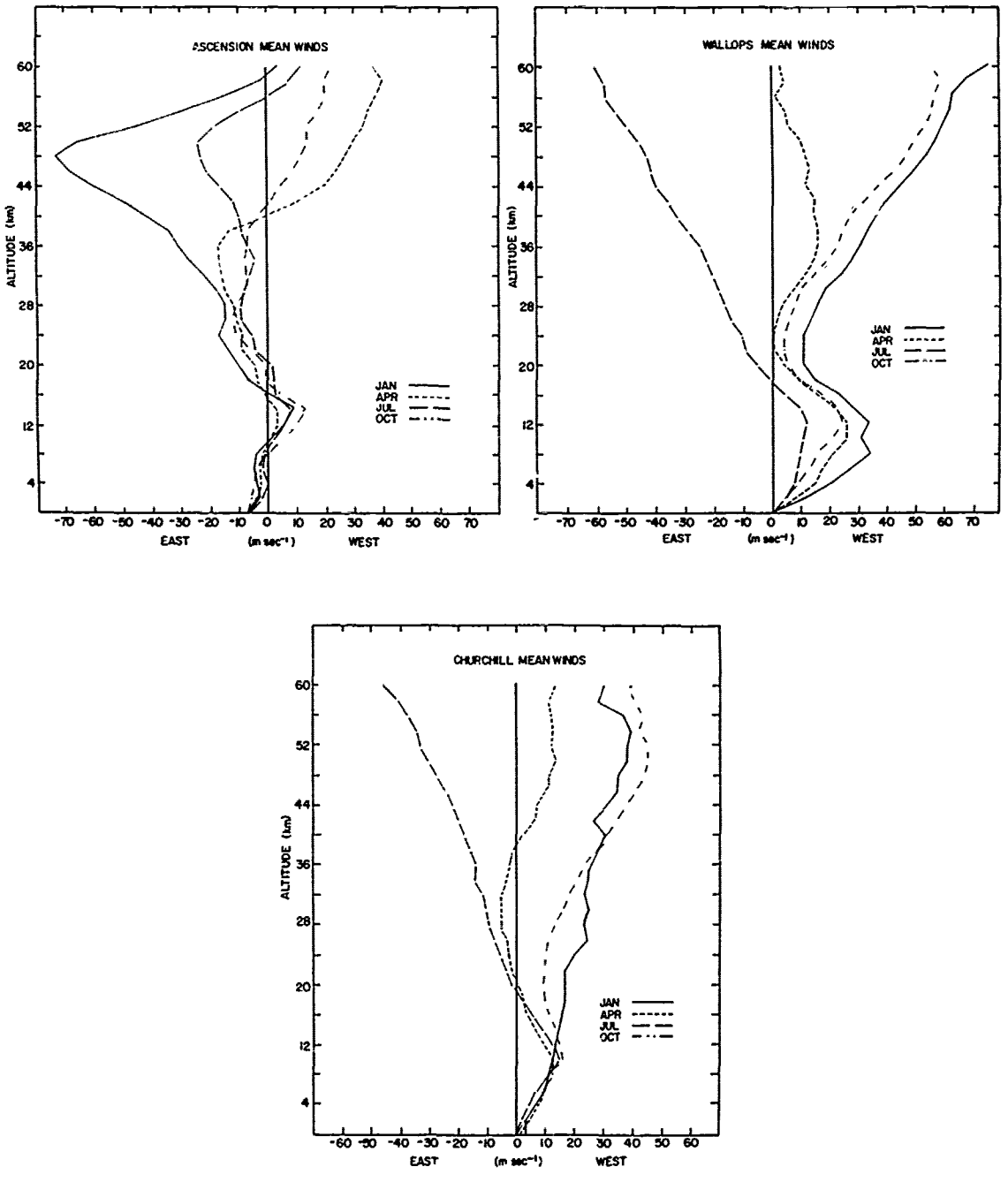

Figure 3. Seasonal Effects on the Zonal Wind Profiles at Ascension Island, Wallops Island, and Churchill

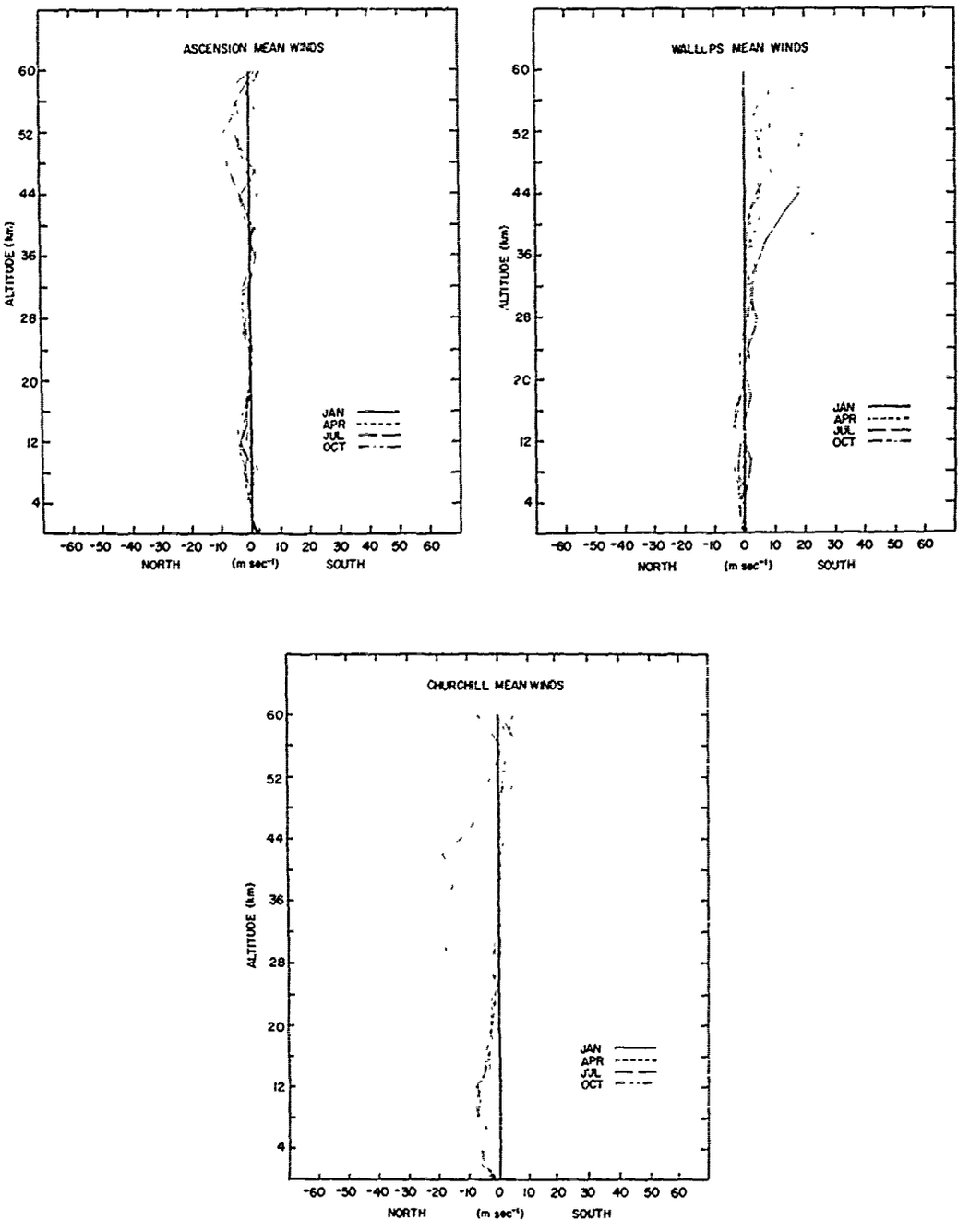

Figure 4. Seasonal Effects on the Meridional Wind Profiles at Ascension Island, Wallops Island, and Churchill

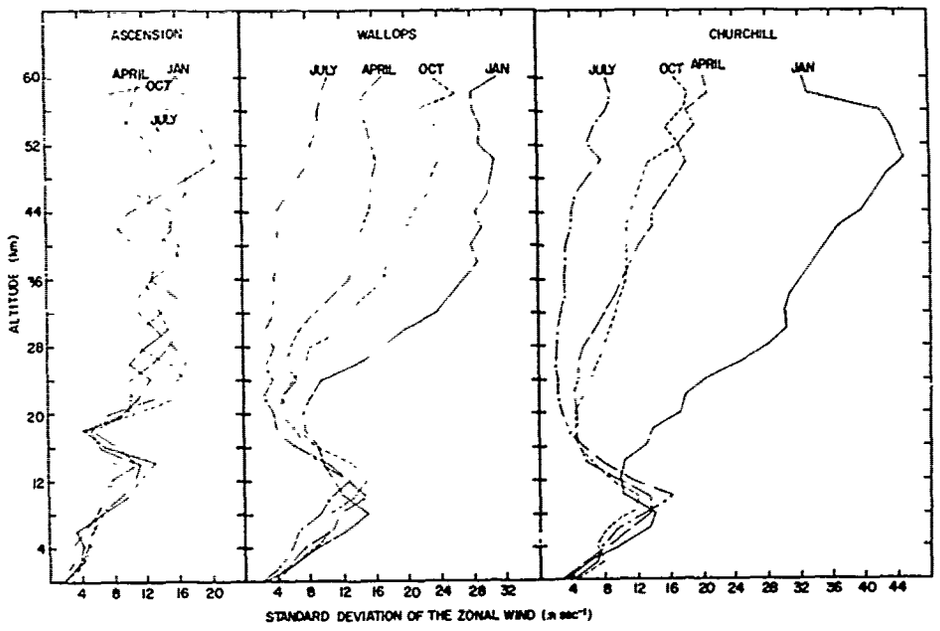

Figure 5. Day-to-day Variability Around Mean Monthly Zonal Winds for the Midseason Months at Ascension Island, Wallops Island, and Churchill

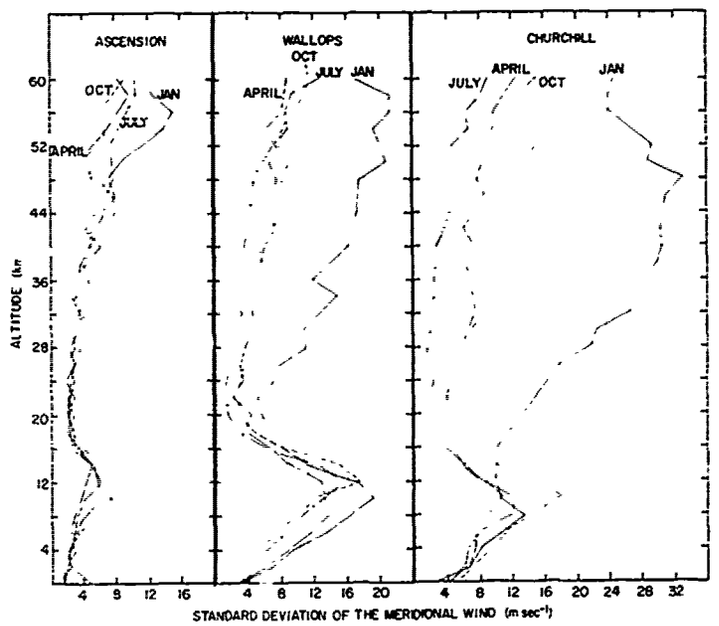

Figure 6. Day-to-day Variability Around Mean Monthly Meridional Winds for the Midseason Months at Ascension Island, Wallops Island, and Churchill

6. INTERLEVEL CORRELATIONS

The rate of decay of the correlations with an increase of either the horizontal or vertical distance between the points of observation, or the time interval between observations, is similar for most meteorological elements such as density, temperature, and wind. As yet, no one fundamental mathematical expression has been found to completely describe this correlation decay. Accordingly, a number of empirical models which are valid for specific meteorological elements over only limited ranges have been developed and used.

Profiles of correlation coefficients (R) of surface wind components with wind components at other altitudes up to 60 km are shown in Figures 7 and 8 for each of the midseason months at Ascension Island, Wallops Island, and Churchill. Correlations between the surface components and those at other altitudes decrease quickly as the vertical distance between levels increases; they generally approach zero and maintain relatively low values during all seasons at the three locations between the surface and all levels above the tropopause (> 8 to 16 km). This indicates that not much information on day-to-day variability around the mean monthly component wind profiles above the tropopause can be obtained from surface wind observations. The decay of the interlevel correlations with increasing separation varies considerably with starting level and season, as can be seen in the tabulations within the statistical arrays in Appendix A.

Profiles of correlation coefficients of the component winds at 26 km with component winds at higher altitudes up to 60 km are shown for each of the midseason months at locations in the tropics (Figures 9 and 10), middle latitudes (Figures 11 and 12), and high latitudes (Figures 13 and 14). The July profiles at Primrose Lake are not shown in Figures 13 and 14 because only 10 or 11 observations were available in July for the development of the interlevel correlations.

Interlevel correlations between zonal components decay most rapidly in the tropics, becoming negative within 6 to 12 km above 26 km. In middle and high latitudes the correlations decay more slowly, remaining positive or near zero at most locations and months. In January, however, correlations at most midlatitude stations become negative above roughly 40 km. The profiles for locations within the same latitude band indicate that the correlations are fairly stable for large areas of the Northern Hemisphere. Consequently, more reliable estimates of the profiles of R for altitudes above 26 km can be derived by using average values for low, middle, and high latitude locations, respectively, obtained either from the plots shown in Figures 9, 11, and 13 or from the statistical arrays in Appendix A.

The meridional components are relatively unimportant since correlations are generally between ± 0.3 at all levels, months, and stations in the tropics; during April, July, and October in the middle latitudes; and during July in high latitudes. The high-latitude correlations decay to near zero or slightly less than zero during the other months at levels above roughly 50 km.

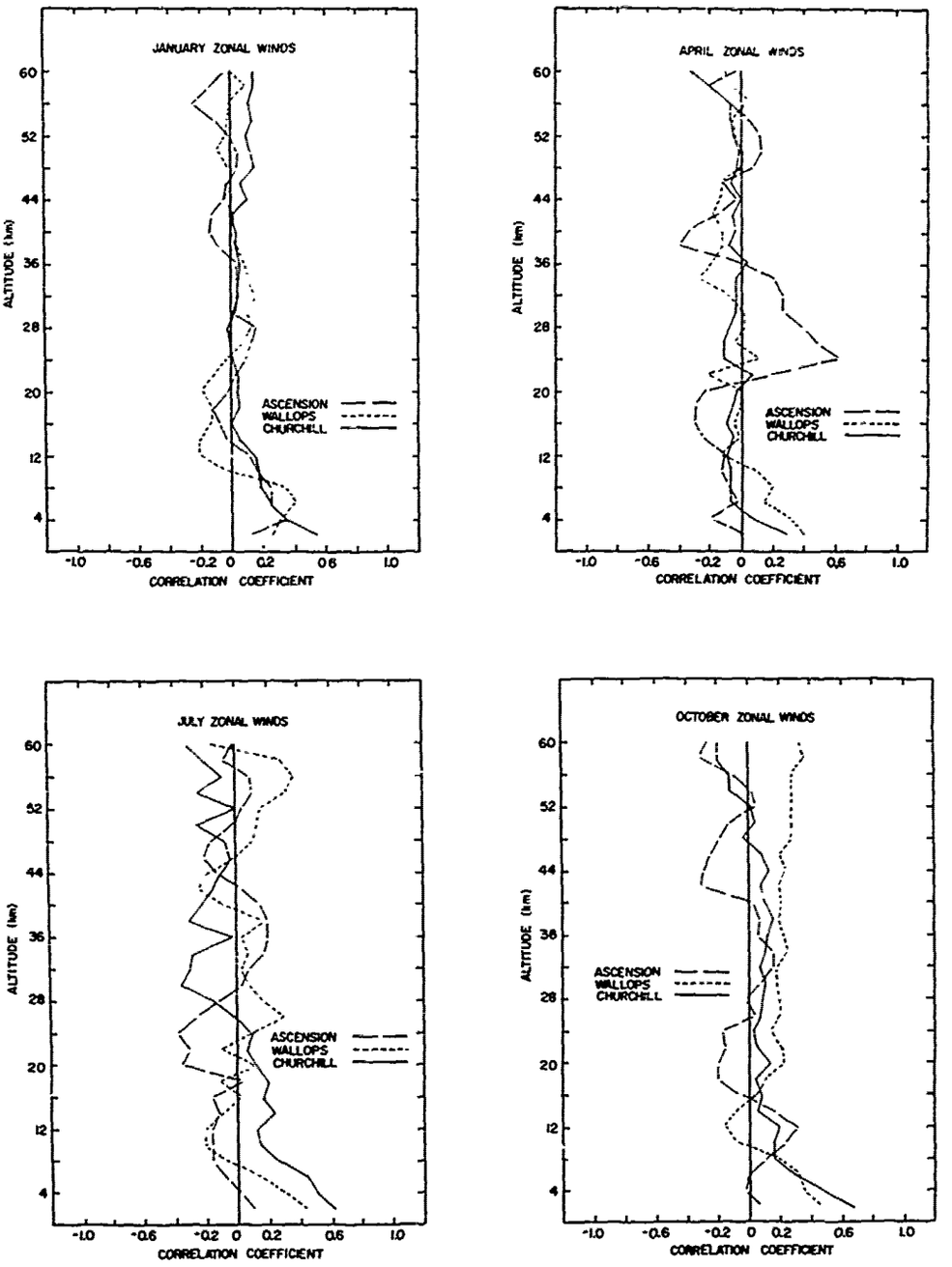

Figure 7. Vertical Profiles of Correlation Coefficients of Zonal Winds at the Surface With Zonal Winds at Other Altitudes up to 60 km for the Midseason Months at Ascension Island, Wallops Island, and Churchill

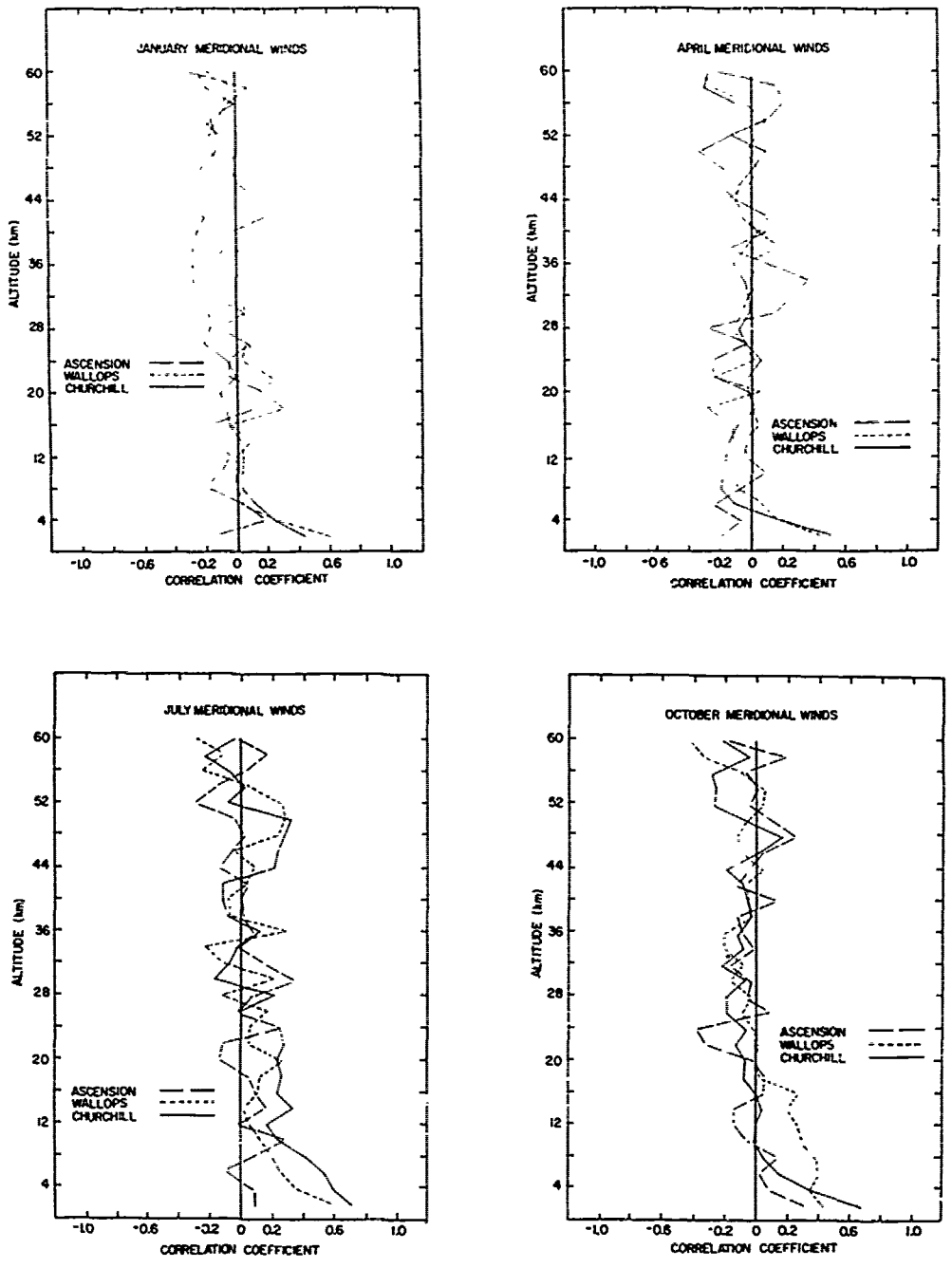

Figure 8. Vertical Profiles of Correlation Coefficients of Meridional Winds at the Surface With Meridional Winds at Other Altitudes up to 60 km for the Midseason Months at Ascension Island, Wallops Island, and Churchill

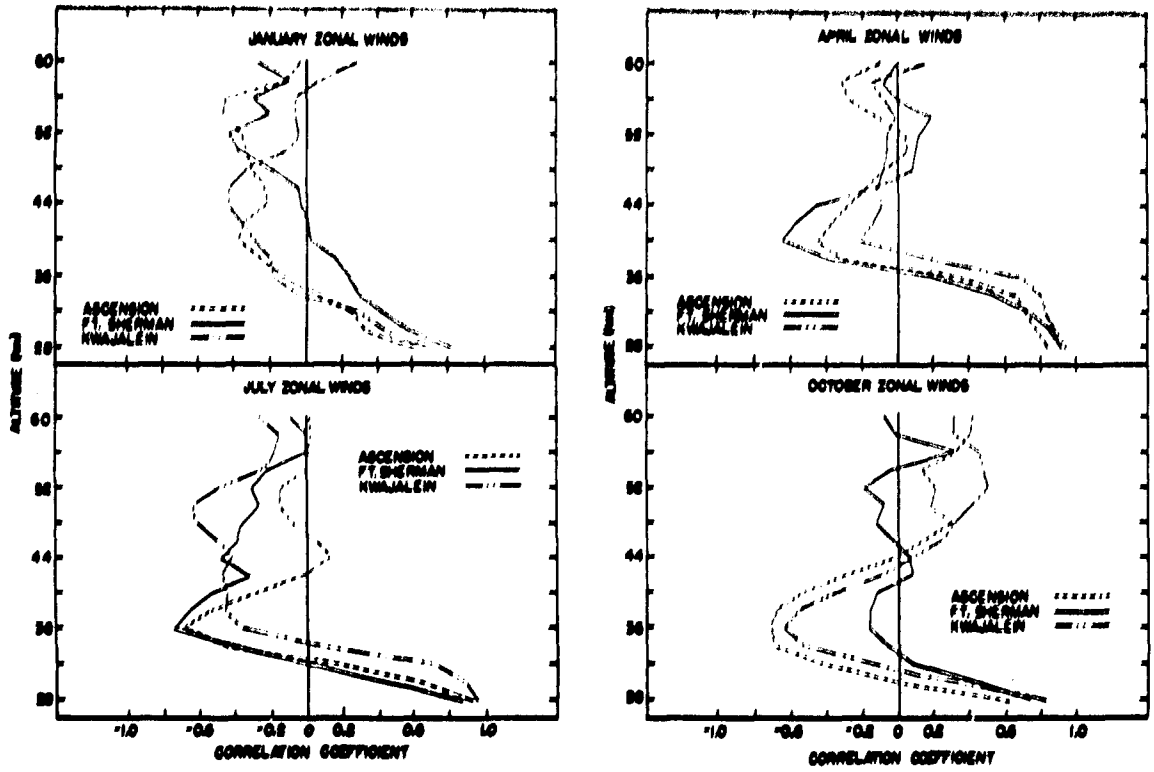

Figure 9. Vertical Profiles of Correlation Coefficients of Zonal Winds at 26 km With Zonal Winds at Higher Altitudes up to 60 km for the Midseason Months at Ascension Island, Fort Sherman, and Kwajalein

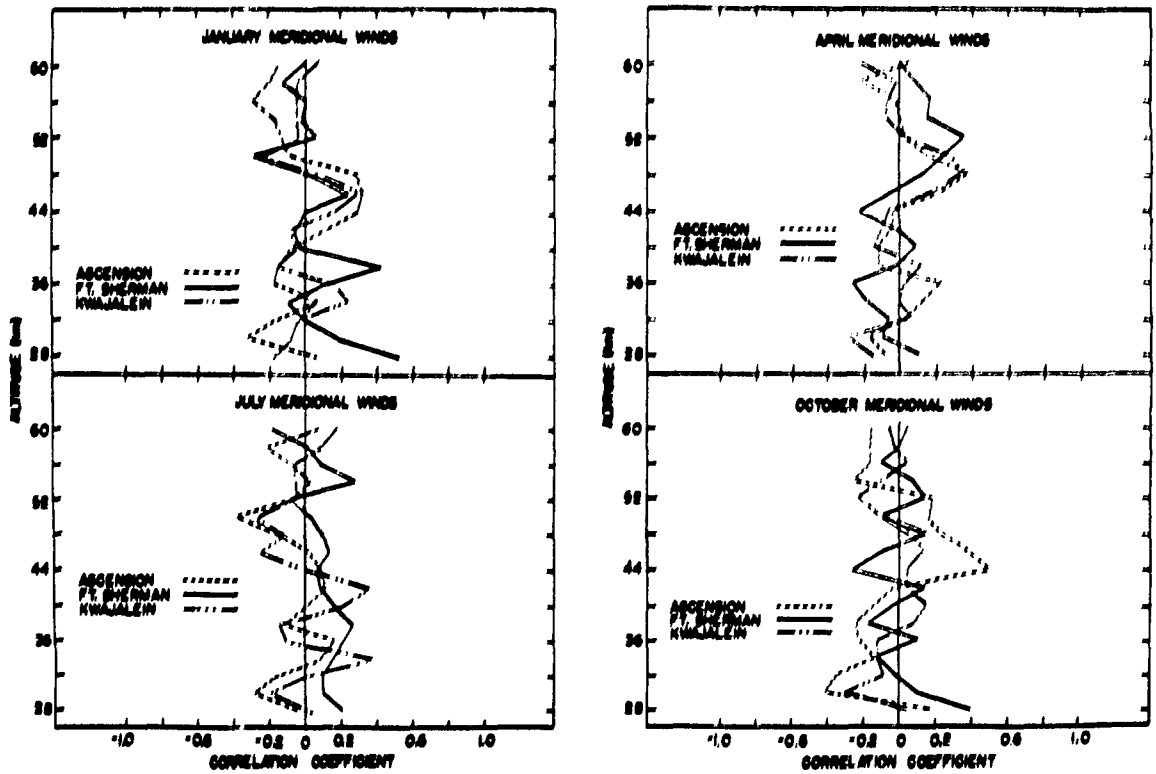

Figure 10. Vertical Profiles of Correlation Coefficients of Meridional Winds at 26 km With Meridional Winds at Higher Altitudes up to 60 km for the Midseason Months at Ascension Island, Fort Sherman, and Kwajalein

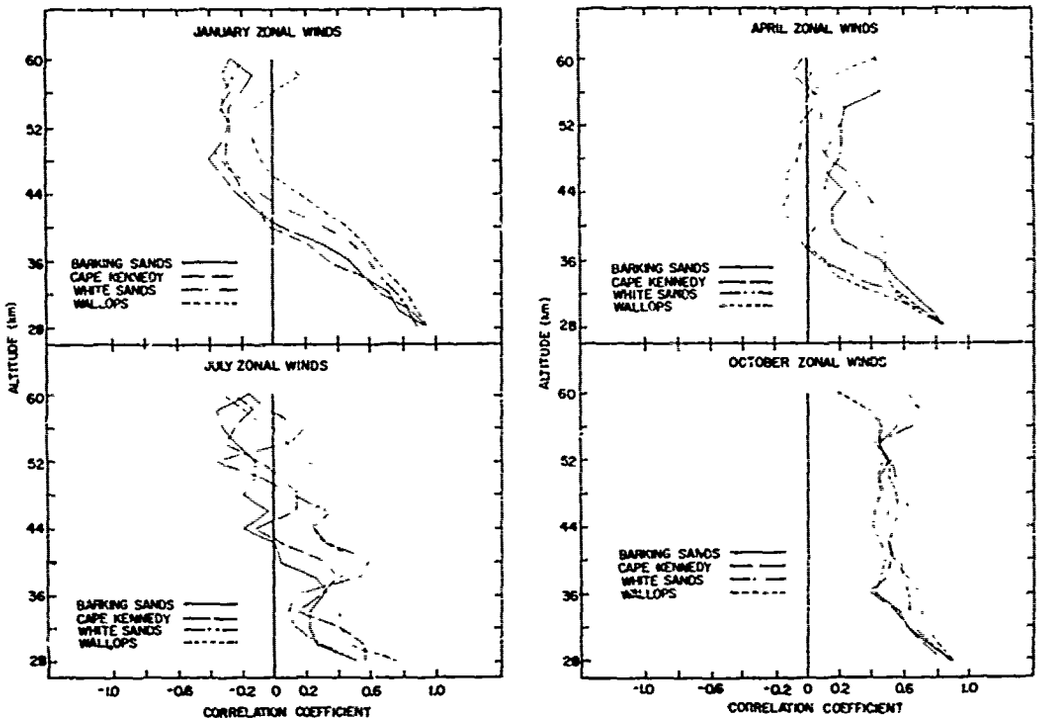

Figure 11. Vertical Profiles of Correlation Coefficients of Zonal Winds at 26 km With Zonal Winds at Higher Altitudes up to 60 km for the Midseason Months at Barking Sands, Cape Kennedy, White Sands, and Wallops Island

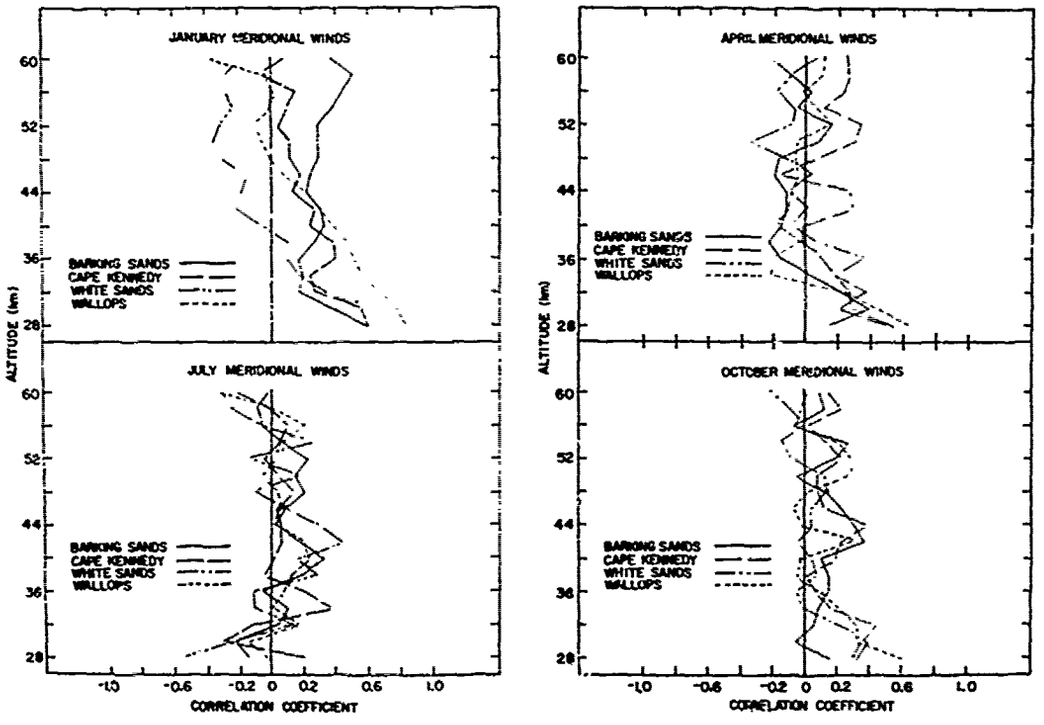

Figure 12. Vertical Profiles of Correlation Coefficients of Meridional Winds at 26 km With Meridional Winds at Higher Altitudes up to 60 km for the Midseason Months at Barking Sands, Cape Kennedy, White Sands, and Wallops Island

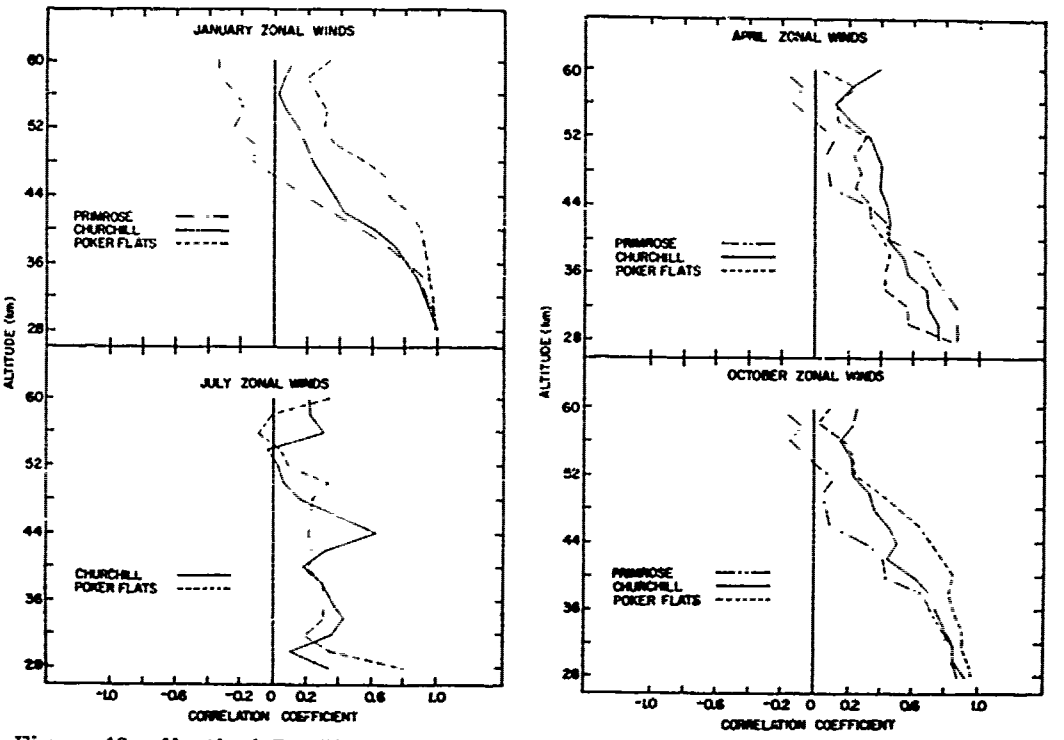

Figure 13. Vertical Profiles of Correlation Coefficients of Zonal Winds at 26 km With Zonal Winds at Higher Altitudes up to 60 km for the Midseason Months at Primrose Lake, Churchill, and Poker Flats

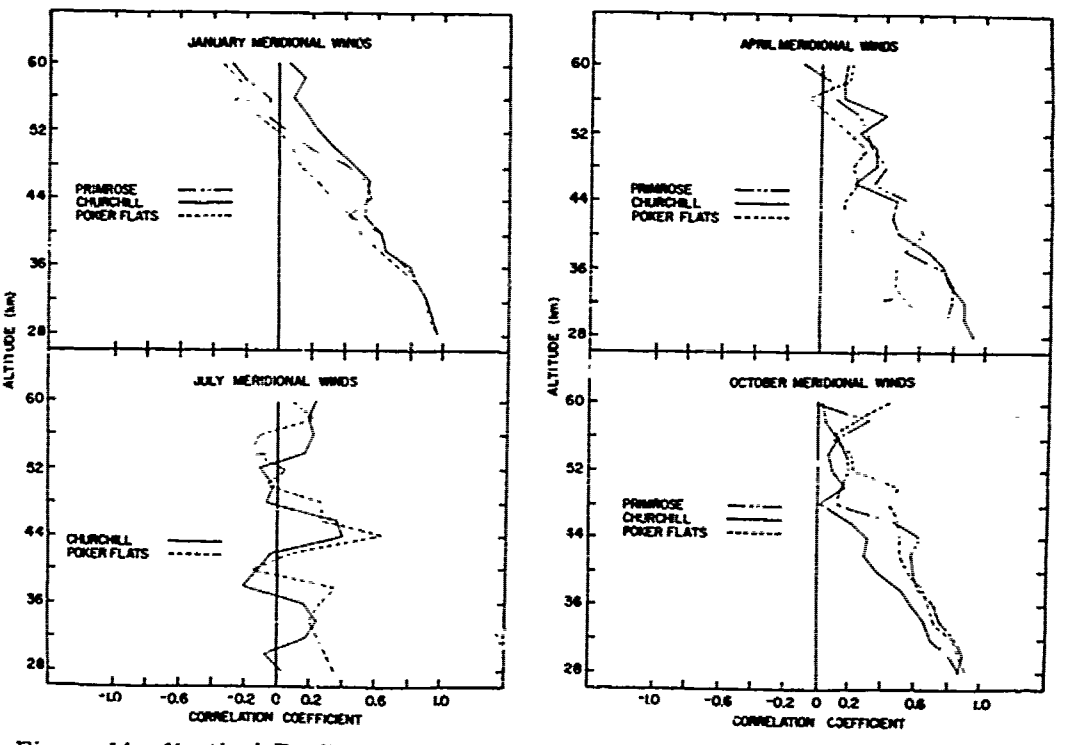

Figure 14. Vertical Profiles of Correlation Coefficients of Meridional Winds at 26 km With Meridional Winds at Higher Altitudes up to 60 km for the Midseason Months at Primrose Lake, Churchill, and Poker Flats

7. EXTREME WINDS

Vertical cross sections of mean monthly zonal and meridional winds have revealed that the strongest monthly vector winds occur in the middle latitudes, generally during November and December. Resulting hemispheric 1-percent extremes have been estimated to reach 215 m sec^{-1} near 55 km.[8] Envelopes of estimated global extreme winds for altitudes from the surface to 80 km can be found in MIL-STD-210B.[9]

Mean monthly vector winds for this report were calculated from monthly component winds for altitudes above 26 km and were found to be largest during winter between latitudes 35°N and 60°N. The 90, 95, and 99 percentile scalar speeds were estimated for Ascension Island, Wallops Island, and Churchill, using the statistical technique outlined in Section 3 of this report. Ascension Island, Wallops Island, and Churchill were selected as locations typical of wind regimes in low, middle, and high latitudes, respectively. Medians and 90, 95, and 99 percentile scalar speeds for the midseason months at these locations are shown in Tables 2, 3, and 4 for altitudes between 26 and 60 km. The largest 1-percent extremes (155 m sec^{-1}) are shown at Wallops Island in January at 50 km, with the maximum apparently occurring at or slightly above 60 km. The 1-percent extreme at Churchill (152 m sec^{-1}), also in January, occurs near 30 km, more typical of a high-latitude location. Extremes are usually smaller in the tropics, as indicated in Table 2 for Ascension Island.

These estimates provide envelopes of the 90, 95, and 99 percentile wind speeds at specific locations for levels between 26 and 60 km. They will not occur simultaneously at all levels; consequently, they cannot be used to represent an extreme wind profile. Because they were determined statistically at all altitudes, assuming independence between levels, they should not be used to determine the effect of wind on a vertically rising or descending vehicle. They are applicable, however, to a vehicle traveling horizontally through the atmosphere such as a constant level balloon or aircraft.

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8. Kantor, A. J. (1969) Strong Wind and Vertical Wind Shear Above 30 km, AFCRL-69-0346.

9. DoD (1973) MIL-STD-210B, Climatic Extremes for Military Equipment, Washington, D.C.

Table 2. Median and 90, 95, and 99 Percentile Scalar Winds (m sec^{-1}) for the Midseason Months at Ascension Island

Altitude (km)	January				April				July				October			
	Percentile				Percentile				Percentile				Percentile			
	50	90	95	99	50	90	95	99	50	90	95	99	50	90	95	99
26	15	31	34	38	11	31	34	39	9	35	39	46	12	35	38	45
28	15	34	37	42	12	35	38	44	9	33	36	43	11	29	31	36
30	18	42	45	51	15	40	43	50	8	29	32	37	7	25	27	32
32	22	44	47	53	16	42	45	52	6	25	27	32	7	29	32	38
34	27	49	52	58	17	42	45	52	5	23	25	30	8	31	35	41
36	31	50	53	58	17	38	40	46	7	28	31	36	7	33	37	44
38	34	53	55	60	13	35	38	44	9	34	38	44	7	34	38	45
40	41	61	63	69	1	27	30	37	10	36	39	46	3	27	30	37
42	50	66	69	73	11	35	39	45	13	38	41	48	2	21	24	30
44	60	79	82	88	20	39	41	47	16	42	46	53	5	25	27	33
46	68	92	96	102	24	41	44	48	21	49	53	61	9	29	32	37
48	73	102	106	114	27	45	48	53	23	52	56	64	12	31	34	39
50	65	99	103	113	30	47	50	55	24	53	57	64	15	35	37	43
52	46	81	86	96	33	50	52	57	18	43	47	53	14	35	37	43
54	29	65	70	80	34	54	57	62	9	34	37	44	18	38	41	46
56	16	52	56	66	38	58	61	67	4	31	34	42	20	35	37	42
58	3	35	40	49	40	62	65	71	9	36	40	48	20	37	39	44
60	4	33	37	44	37	62	65	72	12	41	45	53	22	45	49	55

Table 3. Median and 90, 95, and 99 Percentile Scalar Winds (m sec^{-1}) for the Midseason Months at Wallops Island

Altitude (km)	January				April				July				October			
	Percentile				Percentile				Percentile				Percentile			
	50	90	95	99	50	90	95	99	50	90	95	99	50	90	95	99
26	14	38	42	49	9	11	13	15	14	19	20	22	6	18	20	24
28	16	47	51	60	4	14	16	19	16	22	23	24	8	23	25	29
30	19	54	58	68	8	20	22	26	18	24	25	26	10	29	32	37
32	24	65	71	82	12	27	29	33	20	28	29	31	16	37	40	45
34	28	73	79	91	15	33	35	40	22	29	30	32	20	44	48	54
36	31	76	82	94	16	37	40	46	24	31	32	35	24	52	55	63
38	35	83	90	103	16	39	42	48	28	37	38	40	25	53	57	65
40	39	93	100	115	15	39	42	48	32	41	42	44	28	58	62	71
42	42	93	100	115	15	40	43	50	35	45	46	49	34	67	71	80
44	48	98	104	118	13	40	43	50	39	48	50	52	38	72	77	86
46	53	106	113	128	14	40	44	51	41	52	53	56	45	82	90	97
48	57	111	119	134	13	39	43	50	42	55	57	60	48	85	90	101
50	60	117	124	140	11	37	41	48	45	60	62	67	51	90	95	106
52	62	117	124	140	8	35	38	45	49	66	69	74	55	94	99	110
54	65	118	125	140	9	35	38	45	53	73	75	81	57	96	101	112
56	65	119	126	141	8	33	36	43	56	75	78	83	58	96	101	112
58	70	124	131	146	9	35	39	46	57	78	80	86	60	103	109	121
60	78	132	140	155	7	37	41	49	60	85	89	95	57	96	101	112

Table 4. Median and 90, 95, and 99 Percentile Scalar Winds (m sec^{-1}) for the Midseason Months at Churchill

	January				April				July				October			
Altitude (km)	Percentile				Percentile				Percentile				Percentile			
	50	90	95	99	50	90	95	99	50	90	95	99	50	90	95	99
26	30	78	84	98	3	14	15	18	7	11	12	13	11	25	27	31
28	29	83	90	105	5	17	18	22	9	13	14	15	13	29	31	35
30	30	88	96	111	5	20	22	26	10	14	15	16	16	33	35	40
32	31	92	100	117	5	22	24	28	11	16	17	19	18	37	39	44
34	31	93	101	118	4	22	24	29	14	20	21	23	21	40	43	49
36	30	95	104	122	2	22	24	29	14	20	21	23	24	46	49	55
38	32	100	110	129	1	22	24	29	15	20	21	23	28	49	52	58
40	34	105	115	134	2	24	27	33	18	24	25	27	31	54	57	64
42	32	105	115	134	6	29	32	38	20	29	30	32	34	58	61	67
44	33	109	120	141	7	31	34	41	22	31	32	35	38	63	67	74
46	36	114	125	146	10	36	40	47	24	34	35	38	41	67	71	78
48	36	118	129	152	11	39	43	51	27	39	40	43	44	72	75	83
50	38	119	130	152	13	43	47	56	30	44	46	50	45	74	78	86
52	38	118	129	152	12	43	47	56	34	46	47	51	45	80	84	94
54	39	117	127	149	12	45	49	58	35	49	51	55	42	78	83	92
56	37	110	120	141	12	45	49	58	39	55	57	62	43	78	83	92
58	27	89	98	115	11	47	52	62	41	59	62	67	40	75	80	89
60	31	93	101	118	13	49	54	64	46	65	67	72	39	74	78	88

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Appendix A

Interlevel Correlation Coefficients of Zonal and Meridional Winds for Altitudes up to 60 km

Table A1. Zonal Winds From the Surface to 60 km at Ascension Island

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976

ASCENSION ISLAND

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.079	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-6	-3	-4	-5	-4	1	6	9	0	-7	-10	-14	-17	-15	-15	-18	-22	-27	-31	-34	-41	-50	-60	-68	-73	-65	-45	-29	-15	-2	4
STDV	16	37	42	34	67	98	113	130	70	45	92	113	126	102	120	147	139	134	118	110	111	88	100	139	177	205	204	189	176	173	161
N	42	43	43	43	43	43	43	43	43	43	43	43	41	43	42	43	43	43	43	43	43	43	43	43	43	43	43	43	39	30	26
2	12	**																													
4	25	30																													
6	25	33	28																												
8	23	28	7	55																											
10	15	8	-9	30	77																										
12	11	-3	-5	37	58	86																									
14	-4	-22	-23	14	40	68	82																								
16	-10	0	-16	22	34	59	67	82																							
18	-12	19	-24	12	7	10	5	8	20																						
20	-2	18	-14	-10	-18	-10	1	0	4	48																					
22	2	22	-2	-4	8	7	14	11	11	38	85																				
24	9	28	21	-17	40	26	25	16	13	27	47	84																			
26	12	-14	22	-10	19	29	27	25	-6	-23	-7	18	42																		
28	15	-18	11	-1	18	21	12	24	1	-30	-61	-39	-4	61																	
30	1	-23	-4	-5	11	19	9	27	13	-35	-72	-65	-37	34	99																
32	3	-22	-11	4	18	28	15	30	22	-20	-73	-68	-40	26	81	95															
34	3	-24	-16	5	14	20	5	12	5	-17	-75	-77	-53	7	65	76	86														
36	3	-26	-5	9	7	7	-4	4	0	-16	-74	-78	-60	-12	50	59	68	91													
38	-9	-33	-14	5	-7	-7	-6	2	-6	-20	-69	-71	-64	-24	30	39	45	73	87												
40	-14	-9	-22	14	-11	-14	-12	-16	-19	17	-10	-35	-40	-37	2	-1	13	45	58	76											
42	-17	23	3	7	-16	-10	-5	-14	-3	42	22	5	-7	-34	-27	-27	-15	4	8	19	57										
44	-15	21	16	-3	0	-2	8	-7	1	25	34	28	17	-21	-41	-48	-40	-19	-9	-3	26	53									
46	-2	2	19	-12	-1	-12	-4	-7	7	12	21	24	18	-23	-34	-35	-36	-34	-21	-18	-16	-2	51								
48	3	6	3	-8	-1	-24	-13	-16	-11	9	33	35	19	-31	-48	-50	-51	-41	-27	-22	-15	0	46	75							
50	4	20	-8	0	9	-21	-18	-22	-19	3	22	23	10	-34	-36	-36	-36	-26	-17	-13	2	9	37	44	82						
52	-1	31	-16	10	13	-17	-14	-19	-17	-4	7	5	-9	-36	-31	-26	-23	-10	-3	4	26	24	32	16	51	78					
54	-11	40	-13	16	6	-14	-20	-20	-11	-7	3	-2	-17	-47	-42	-31	-27	-15	-6	6	33	31	27	8	23	44	82				
56	-24	42	-3	10	-5	-23	-15	-16	-5	-13	1	-7	-14	-45	-45	-23	-27	-27	-20	-8	1	14	5	-2	22	34	50	72			
58	-14	14	5	13	22	-1	9	2	-10	-13	1	2	7	-10	-34	-30	-33	-28	-21	-6	-5	-11	28	6	14	41	34	35	75		
60	-5	4	0	8	18	-9	1	-2	-15	-11	-4	2	7	-4	-28	-28	-30	-19	-8	-6	-12	-20	28	13	48	42	21	10	46	83	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A1. Zonal Winds From the Surface to 60 km at Ascension Island (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976
ASCENSION ISLAND
EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.0F9	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-7	-4	-3	-3	-2	1	3	3	-1	-4	-5	-9	-9	-11	-12	-15	-16	-17	-17	-13	0	10	20	24	27	30	33	34	38	40	37
STDV	16	27	24	39	60	65	75	108	83	56	94	102	99	128	147	161	166	159	129	137	157	153	112	103	108	104	96	113	106	110	139
N	38	38	38	38	38	38	38	38	38	38	37	36	34	38	37	38	38	38	38	38	38	36	36	38	38	38	38	38	34	27	20
2	1	**																													
4	-20	74																													
6	-4	8	40																												
8	-9	11	18	53																											
10	-14	-14	1	37	75																										
12	-11	-36	-16	23	43	78																									
14	-25	-32	-22	18	38	52	78																								
16	-29	-19	-5	34	48	55	61	79																							
18	-29	6	15	10	30	37	14	17	36																						
20	-24	-16	0	0	7	9	6	10	22	65																					
22	19	-12	-8	4	-1	-3	-22	-35	-15	48	59																				
24	62	-9	-14	10	-10	-9	-12	-23	-14	-15	-19	37																			
26	47	2	-1	-11	-34	-29	-13	-26	-38	-56	-46	-13	68																		
28	39	-3	-10	-7	-28	-27	-8	-6	-23	-70	-65	-42	58	84																	
30	26	1	-6	2	-15	-15	2	4	-10	-73	-68	-50	44	77	94																
32	26	3	-5	9	-5	-5	11	11	-2	-75	-72	-56	39	71	89	96															
34	21	10	-5	19	1	-1	14	12	0	-69	-70	-58	32	66	83	92	96														
36	0	24	30	40	22	24	29	31	27	-41	-60	-59	12	35	52	69	76	84													
38	-10	20	36	53	39	49	38	40	50	22	-1	-19	-28	-31	-23	-3	5	15	61												
40	-34	1	6	34	15	34	24	19	34	39	28	24	-19	-44	-46	-34	-28	-20	10	71											
42	-16	-7	-8	26	7	33	22	8	33	46	37	43	2	-37	-38	-36	-30	-28	-9	47	85										
44	-4	-17	-17	23	7	31	15	3	23	43	36	51	18	-26	-25	-31	-27	-28	-18	30	70	89									
46	-8	-12	-9	21	8	32	7	-10	12	46	29	48	22	-17	-21	-25	-24	-25	-17	21	56	71	82								
48	7	-4	-5	9	19	32	6	-11	5	18	18	35	21	-8	-9	-18	-18	-20	-23	-4	21	41	58	79							
50	12	0	3	13	22	27	3	-15	-3	25	10	33	32	5	0	-10	-9	-13	-16	-8	7	24	40	67	91						
52	11	3	8	15	27	36	11	-10	-2	31	12	35	34	4	-3	-13	-12	-15	-11	1	14	30	45	67	85	95					
54	4	16	15	24	24	33	7	-16	1	27	-1	32	24	-11	-19	-25	-19	-15	-8	14	29	46	53	64	74	76	84				
56	-7	31	18	20	26	21	-3	-15	5	32	16	34	5	-28	-36	-40	-32	-28	-24	5	29	44	45	50	55	59	68	88			
58	-20	9	10	10	23	31	18	-4	8	22	5	27	-13	-31	-43	-44	-39	-30	-20	8	17	28	23	24	27	37	52	71	79		
60	-4	45	39	-1	-12	2	-22	-55	-33	27	4	36	0	-9	-49	-54	-48	-40	-30	-7	8	27	9	12	0	15	31	59	73	81	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A1. Zonal Winds From the Surface to 60 km at Ascension Island (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976

ASCENSION ISLAND

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.079	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-6	-2	0	-2	-1	2	6	8	2	2	1	-4	-5	-9	-9	-8	-6	-5	-7	-9	-10	-12	-16	-21	-23	-24	-16	-9	1	6	12
STDV	30	31	43	52	61	90	110	113	64	53	72	134	200	169	155	133	117	114	131	160	162	151	161	170	172	172	147	139	149	146	162
N	51	51	51	51	51	51	51	51	51	51	50	47	43	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	49	43	30
2	11	**																													
4	2	65																													
6	-7	38	76																												
8	-16	17	31	51																											
10	-16	2	7	24	77																										
12	-16	10	6	18	55	81																									
14	-11	11	17	34	53	69	84																								
16	-15	16	33	47	50	51	57	74																							
18	3	6	15	27	25	16	19	43	62																						
20	-35	4	0	-3	16	30	37	27	15	13																					
22	-30	5	6	-2	4	4	5	-11	-19	-37	74																				
24	-38	-4	13	8	2	-8	-9	-18	-14	-28	44	85																			
26	-26	10	9	5	4	3	-2	-14	-21	-31	55	89	87																		
28	-12	11	5	0	-3	-5	-7	-16	-26	-26	50	85	81	95																	
30	3	12	6	-2	-15	-31	-35	-38	-48	-23	15	52	59	65	80																
32	6	6	7	1	-21	-43	-45	-41	-43	-6	-19	1	17	20	35	77															
34	18	5	16	18	6	-10	-18	-5	3	36	-47	-58	-44	-43	-33	6	57														
36	20	12	13	9	17	9	0	12	20	41	-46	-72	-66	-68	-58	-48	-8	62													
38	21	2	8	9	20	19	9	16	12	27	-33	-56	-57	-53	-58	-55	-32	24	83												
40	16	3	11	12	16	17	3	5	-7	8	-22	-33	-37	-29	-36	-38	-29	7	61	90											
42	4	8	11	10	10	8	-4	-8	-20	-1	3	-2	-15	-2	-8	-14	-14	0	40	68	88										
44	-11	11	5	10	10	10	-2	-13	-14	-9	19	18	2	14	4	-10	-16	-8	23	47	65	87									
46	-19	7	2	11	11	19	14	4	4	1	20	11	-5	6	-7	-27	-26	-7	26	44	54	71	90								
48	-16	6	-6	4	5	19	22	14	14	8	11	-3	-18	-7	-19	-40	-29	-4	30	43	44	52	68	89							
50	-1	8	-15	-12	-9	5	14	13	8	14	6	-10	-24	-15	-22	-39	-25	-6	27	34	34	38	45	65	87						
52	4	10	-15	-11	-8	-6	2	8	8	23	-1	-11	-17	-14	-20	-28	-16	-2	23	27	26	27	32	46	67	83					
54	10	16	-3	8	1	0	9	17	24	33	6	-2	-3	0	-7	-24	-20	-6	19	25	20	16	22	31	43	57	77				
56	9	8	-8	-4	4	7	18	26	33	36	15	3	-2	2	-4	-25	-30	-13	17	24	17	15	21	28	38	46	64	92			
58	-7	-2	-5	0	5	14	34	42	49	33	35	10	0	3	-5	-38	-58	-40	-2	12	4	2	10	16	21	25	39	68	85		
60	-2	-2	-29	-27	-9	9	28	34	34	29	33	-8	-21	2	2	-6	-19	-12	-8	-6	-16	-14	3	4	5	9	19	42	46	69	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A1. Zonal Winds From the Surface to 60 km at Ascension Island (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976

ASCENSION ISLAND

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.079	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-7	-6	-5	-4	-1	5	10	13	4	-1	-1	-6	-11	-12	-11	-7	-7	-8	-7	-7	-3	1	4	9	12	14	14	18	20	20	22
STDV	19	40	50	50	60	74	78	81	51	41	109	159	172	151	112	112	138	150	170	174	151	119	113	107	107	114	124	112	81	81	125
N	53	53	53	53	53	53	53	53	53	53	53	51	51	54	53	54	54	54	54	54	54	54	54	54	54	53	54	53	47	42	29
2	7	**																													
4	-2	83																													
6	1	33	58																												
8	11	26	27	44																											
10	25	18	13	25	81																										
12	31	16	11	18	59	79																									
14	17	18	27	27	50	61	76																								
16	-6	11	21	32	40	36	37	58																							
18	-23	25	21	28	12	3	-11	-4	27																						
20	-19	32	16	13	18	12	-6	-22	11	49																					
22	-15	26	11	8	19	16	2	-13	5	43	89																				
24	-17	9	-3	0	16	13	0	-11	-1	36	75	93																			
26	5	2	-9	0	22	23	17	-6	9	14	57	74	79																		
28	-2	0	-6	-3	21	24	16	15	3	8	17	42	59	63																	
30	7	-26	-17	-16	-2	3	15	29	-2	-28	-56	-38	-15	2	51																
32	16	-22	-8	-12	-13	-4	14	32	-5	-35	-78	-74	-56	-41	10	76															
34	15	-9	1	-9	-19	-13	6	24	-1	-29	-75	-87	-83	-68	-35	38	81														
36	6	3	13	3	-19	-14	2	23	6	-25	-63	-77	-85	-70	-54	8	54	86													
38	7	6	14	9	-14	-10	-3	18	8	-16	-43	-60	-77	-67	-52	-17	26	69	90												
40	2	1	8	15	-4	-5	-6	8	6	0	-25	-39	-58	-53	-63	-37	1	45	70	91											
42	-30	10	2	10	-7	-12	-22	-16	-9	16	0	-4	-19	-29	-44	-46	-28	7	35	52	74										
44	-28	4	-3	10	1	-2	-14	-19	-20	21	11	14	10	0	-18	-35	-20	-15	5	16	34	79									
46	-23	10	2	10	6	3	-11	-15	-13	32	26	29	25	14	-1	-33	-35	-26	-7	6	28	67	90								
48	-29	21	10	5	8	0	-14	-12	-1	40	40	39	30	30	18	-20	-33	-23	-7	5	26	56	80	74							
50	-11	22	18	6	7	3	-12	-4	0	31	26	23	15	18	17	-8	-15	-3	7	15	21	34	31	45	79						
52	5	19	17	10	4	4	-11	-7	0	38	28	23	16	20	22	-3	-17	-11	-5	3	8	14	9	24	58	86					
54	3	13	16	7	-1	5	-8	2	14	40	28	16	9	14	21	0	-12	-5	7	14	18	16	10	24	54	74	86				
56	-10	4	11	12	15	14	2	-4	20	39	34	38	28	33	22	-10	-27	-27	-15	4	19	22	23	34	59	59	63	77			
58	-31	-7	-13	-23	-6	-4	-18	-30	-17	5	17	34	36	41	37	14	-20	-38	-34	-28	-19	3	11	16	32	21	25	29	52		
60	-6	-20	-15	-32	5	13	8	2	-23	-28	-20	24	41	42	46	40	12	-33	-35	-35	-29	-13	6	-2	-12	-15	-16	-11	27	74	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A2. Meridional Winds From the Surface to 60 km at Ascension Island

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976
ASCENSION ISLAND
NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.079	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	3	0	0	0	-2	-1	-3	-1	-1	-1	0	1	0	-2	-1	0	0	1	2	1	1	-2	-3	-5	-7	-8	-6	-5	-4	-2	2
STDV	115	17	25	26	31	39	42	50	38	22	22	21	25	32	36	49	41	49	47	54	65	63	80	00	73	84	110	134	152	125	97
N	42	43	43	43	43	43	43	43	43	43	43	43	41	43	42	43	43	43	43	42	43	43	43	43	43	43	43	43	39	30	26
2	-115	**																													
4	16	39																													
6	6	-10	48																												
8	-20	-23	3	1																											
10	-11	-28	-20	-8	61																										
12	-4	-7	-29	-16	38	68																									
14	-12	-23	-27	-16	27	61	61																								
16	-14	-29	-17	11	41	49	33	46																							
18	13	17	-5	10	-22	-9	-5	2	10																						
20	17	15	6	-2	-9	-32	2	-17	-37	-1																					
22	-5	5	-15	5	14	4	6	12	18	-12	15																				
24	-4	-6	-9	18	30	28	14	16	22	10	-16	38																			
26	8	-24	-26	-10	-12	17	21	23	13	18	11	-11	-7																		
28	-9	9	3	-1	2	0	-4	7	18	8	-21	18	10	6																	
30	6	-2	15	23	16	-6	1	-2	4	2	0	-5	14	-31	19																
32	5	-10	16	19	11	-14	-13	-3	-8	-6	20	-3	29	-16	-32	52															
34	16	-14	-9	-21	-5	-3	-7	2	-2	4	-6	-10	-14	8	-16	-70	-26														
36	10	-3	-5	-22	-12	5	0	13	-9	-2	-2	-11	-21	-17	-37	-63	-23	70													
38	0	0	6	2	14	11	10	-5	-20	-26	-5	11	-15	-14	-19	-48	-21	45	51												
40	-3	9	6	-1	8	11	7	-21	-19	-25	15	18	-18	-8	22	-49	-39	29	29	64											
42	20	17	28	-7	-21	-10	-13	-36	-44	6	20	-21	-8	11	3	-26	-12	20	19	17	46										
44	16	21	18	11	-27	-24	-3	-29	-20	9	32	13	-13	30	19	-35	-36	8	1	13	28	46									
46	2	17	-15	-4	-15	-12	17	13	-4	8	25	17	-12	32	9	-14	-13	-10	-10	-25	-13	-17	43								
48	-2	5	-32	-17	-3	5	25	28	0	3	14	34	16	29	18	2	7	-19	-13	-27	-18	-20	11	67							
50	1	1	-23	-24	-8	-8	-11	10	3	6	0	31	29	-8	7	-10	16	16	16	-11	-13	-18	-9	11	59						
52	-10	-2	-9	-10	7	12	-9	18	13	15	-15	24	35	-13	1	-25	0	18	31	13	11	-7	-8	-19	19	71					
54	-20	-2	-3	-9	28	25	1	25	11	9	-21	12	29	-16	-7	-25	1	23	37	22	9	-10	-17	-28	-3	41	85				
56	-8	-13	3	8	21	25	-10	9	6	6	-18	13	33	-27	-10	-10	20	12	31	24	15	8	-25	-51	-24	16	59	78			
58	-2	-4	-2	8	4	35	16	26	21	21	-13	-19	47	-19	-21	-7	24	11	44	12	-3	7	-51	-56	-29	6	38	53	75		
60	-19	-33	-26	-24	7	25	4	8	8	0	-5	-23	-5	-14	-31	-18	24	7	22	26	14	-4	-45	-29	-30	0	6	2	38	43	

** MULTIPLY TABULAR VALUES BY 0.011 TO OBTAIN CORRELATION COEFFICIENTS

Table A2. Meridional Winds From the Surface to 60 km at Ascension Island (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976
ASCENSION ISLAND
NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.079	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	3	1	-1	0	1	-1	-4	-4	-2	0	0	1	1	-1	-2	-2	-1	1	2	?	2	4	3	1	-1	-3	-3	-2	-1	0	3
STDV	16	19	26	26	32	41	60	45	29	21	22	29	21	31	24	32	34	37	40	41	61	42	54	47	50	46	58	68	81	96	82
N	30	38	38	38	38	38	38	38	38	38	37	36	34	38	37	38	38	38	38	38	38	38	38	38	38	39	38	38	34	27	20
2	-20	**																													
4	-6	49																													
6	-23	10	31																												
8	-6	-8	-3	19																											
10	14	-33	-12	-3	52																										
12	-4	3	-10	-25	7	69																									
14	-22	-18	-24	23	55	69																									
16	0	1	12	13	10	-5	-10	-11	25																						
18	-27	14	44	31	19	16	-3	-11	7	12	0	33	-4	-8																	
20	-1	11	-2	13	4	-3	-13	-17	-4	22																					
22	-25	14	11	24	18	-1	-5	0	3	-2	15																				
24	-25	14	2	2	-7	-9	20	15	0	5	26	12																			
26	-27	14	44	31	19	16	-3	-11	7	12	0	33	-4	-8																	
28	-27	14	44	31	19	16	-3	-11	7	12	0	33	-4	-8																	
30	17	-6	8	18	31	10	-5	-3	-1	-3	2	7	-10	-18	13																
32	27	1	-21	-39	-2	-12	-5	20	17	-1	6	-2	24	5	-24	12															
34	37	-4	-30	-33	-7	13	27	28	1	1	16	-7	29	12	-7	-8	43														
36	8	-25	-30	-10	4	22	26	12	6	-1	34	-6	20	23	-14	-13	-18	20													
38	-15	-9	-4	21	16	-12	-27	-22	9	41	-6	-13	9	-12	7	21	-12	-23	-6												
40	18	-22	2	-2	1	-6	-29	-31	2	17	-12	16	-22	-12	14	24	7	0	-14	54											
42	10	-10	-21	9	-15	-5	-12	-11	11	-5	-7	12	-3	-5	3	26	43	7	-34	9	33										
44	-10	7	3	35	-1	-2	7	3	-3	-9	6	13	3	-3	11	16	-3	-6	-8	-29	-51	29									
46	-19	-4	9	25	-4	4	6	12	-7	-9	-4	-9	15	23	15	1	3	-20	12	-24	-54	6	54								
48	-18	5	-24	5	-4	4	22	27	11	-4	-8	3	14	38	-23	9	18	-5	25	-8	-26	9	9	49							
50	-33	-3	-19	15	22	19	17	8	17	19	24	-2	1	16	8	9	-8	-16	30	35	-4	-3	23	24	36						
52	-13	-34	-31	-11	1	24	25	14	23	3	13	-7	25	2	3	8	3	5	43	36	9	16	1[illegible]	9	16	46					
54	10	-32	-36	-21	-21	16	26	14	21	-20	-15	14	3	[illegible]	-17	-1	23	13	25	-1	9	36	1[illegible]	2	28	8	56				
56	19	-27	-29	-54	-1	23	21	17	26	-13	-12	28	-4	-3	8	15	27	31	3	8	28	32	-1[illegible]	-35	-3	-2	18	67			
58	16	-25	-17	-39	32	50	23	15	55	1	-22	-11	-8	-28	5	37	21	13	-9	28	37	31	-1[illegible]	-37	-9	10	16	33	75		
60	-21	-9	-14	-16	38	25	-5	2	45	2	17	42	3	6	-5	11	-2	-8	14	6	0	-18	-1[illegible]	-33	-1	6	-14	8	48	70	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A2. Meridional Winds From the Surface to 60 km at Ascension Island (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976
ASCENSION ISLAND
NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.079	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	2	1	-1	-1	-1	-3	-3	-2	-1	0	0	0	0	-1	0	1	1	0	0	1	2	4	3	4	1	-2	-4	-3	-4	-4	1
STDV	44	25	31	36	40	60	56	52	37	27	25	25	29	25	28	30	34	32	36	39	49	66	74	70	78	76	75	84	92	106	103
N	51	51	51	51	51	51	51	51	51	51	50	47	43	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	49	43	30
2	9	**																													
4		46																													
6	-16	24	62																												
8	8	18	18	21																											
10	28	7	15	-6	54																										
12	-1	24	28	15	52	50																									
14	10	-2	14	12	49	35	42																								
16	9	-10	9	9	44	6	24	40																							
18	4	14	17	25	23		-5	30	40																						
20	-14	1	7	3	-17	-9	-14	9	-23	-5																					
22	-11	-10	-3	23	4	-5	6	7	5	-3	36																				
24	-25	-10	1	1	-28	-11	-10	6	-19	-13	-1	15																			
26	-5	-10	-2	-16	17	8	-20	-2	7	-6	2	-4	-3																		
28	7	-18	3	-14	-2	27	-8	-1	12	22	7	-8	-35	-4																	
30	35	2	30	15	-28	1	0	2	-3	-13	11	-2	3	-27	35																
32	15	-5	9	26	-41	-21	-12	18	8	4	10	9	8	-16	-30	10															
34	-1	11	-12	11	-12	-23	-17	6	-8	2	1	-10	-7	8	-24	-25	27														
36	9	7	-4	8	6	5	-9	2	-16	-8	19	-4	-4	16	-5	-9	-4	27													
38	2	-23	3	-16	9	4	-4	-6	3	-9	-8	-10	-13	-11	11	-8	-15	-34	21												
40	0	12	-13	-24	-11	-17	-31	-23	-15	-9	-5	-28	2	1	0	10	-7	-22	-7	31											
42	-14	12	-2	-3	-18	-19	-28	8	-23	-2	17	-21	4	11	-1	19	12	-2	-9	4	64										
44	-14	-2	7	4	-26	-36	-22	7	0	-16	9	11	-5	9	-25	-7	14	13	24	28	18	31									
46	-15	-10	1	10	-7	-7	-14	7	30	5	-6	-11	-2	1	-22	-16	10	16	13	20	-11	-13	59								
48	2	4	3	-4	-3	0	-11	7	17	36	-8	-26	-30	-14	26	-8	9	7	2	14	-5	-22	5	56							
50	-4	11	3	2	-3	-5	3	23	5	30	-1	-25	-24	-38	13	-5	17	12	-12	-12	-9	-12	-18	5	64						
52	-29	10	9	8	-8	-12	12	15	9	17	-3	-17	-10	-6	-6	-20	13	20	-16	-15	-7	9	12	3	20	54					
54	-17	-11	-2	-28	-16	-25	5	-2	-19	-13	-10	-21	-7	-4	-30	-8	12	-6	-4	15	26	24	28	-7	5	55	58				
56	4	-18	-14	-31	-14	-27	-20	-21	-19	-26	-7	1	12	-6	-21	-4	-1	-15	-2	28	27	10	18	-5	-12	-15	17	64			
58	17	-6	-8	-34	-5	-13	-12	-8	-23	-24	21	1	13	-28	-1	-3	-11	0	16	19	17	-10	-6	-25	-12	-2	-4	9	68		
60	-1	25	29	-7	-11	-28	-35	-26	-37	-38	31	-29	17	7	-1	18	-24	12	15	19	26	31	8	-37	-39	-6	8	11	34	51	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A2. Meridional Winds From the Surface to 60 km at Ascension Island (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976

ASCENSION ISLAND

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.079	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	3	1	-1	0	2	1	-1	-1	-1	-1	0	0	1	0	-2	-2	-1	0	1	1	0	2	3	-1	-3	-4	-2	-3	-1	-1	3
STDV	17	23	21	30	54	74	76	61	37	27	23	23	34	26	37	36	39	34	37	41	48	47	64	76	66	63	59	67	61	74	90
N	53	53	53	53	53	53	53	53	53	53	53	51	51	54	53	54	54	54	54	54	54	54	54	54	54	54	53	54	54	48	43	29
2	32	**																													
4	10	42																													
6	3	-10	30																												
8	14	-9	-19	38																											
10	-5	-12	-24	14	76																										
12	-13	-3	-11	12	54	79																									
14	-13	-4	-9	7	40	61	77																								
16	5	-5	-2	12	34	37	47	61																							
18	6	2	1	-7	31	24	10	13	12																						
20	-2	2	4	-1	-2	-10	-16	-22	-15	-4																					
22	-31	-21	11	4	-15	-11	-7	-12	10	-8	14																				
24	-38	-30	-1	1	0	13	12	15	5	5	2	17																			
26	4	7	4	7	18	23	27	25	12	-4	-12	-35	20																		
28	-6	12	-10	-12	2	1	4	14	15	-7	12	-10	-6	16																	
30	-3	-20	-5	-8	-9	4	-19	-13	-21	6	7	20	-13	-41	-10																
32	-16	-1	22	-1	-12	-10	-10	2	-3	18	-5	14	-11	-35	-27	24															
34	-1	-8	14	-1	30	34	32	31	29	12	-16	-17	-3	8	6	-27	16														
36	-8	-6	-10	-13	-16	-14	-3	-10	-32	-12	-22	-6	-10	-22	1	9	-3	-11													
38	-12	-15	-23	-16	-18	-12	-8	-20	-29	-18	14	6	10	-23	-7	2	-9	-6	48												
40	12	7	0	-6	2	-13	-24	-18	-2	6	16	14	-13	-14	6	0	11	5	-22	21											
42	-12	-3	17	2	12	4	16	11	11	16	-8	7	0	-3	31	13	2	11	-20	-34	46										
44	-5	-8	-5	4	24	11	19	17	3	-12	-1	-21	36	50	21	-28	-27	2	-3	-8	-23	16									
46	4	-5	-1	12	27	13	20	8	8	-14	15	4	10	38	4	-5	6	-4	-1	-7	-12	1	66								
48	24	5	10	12	32	22	24	5	11	-2	10	10	-1	21	1	-8	7	11	-9	17	23	1	38	59							
50	10	6	-3	-8	1	-5	-2	-1	-2	5	6	10	22	16	18	-11	-5	6	1	24	15	2	23	11	53						
52	-4	-9	0	-5	6	6	-4	3	0	25	1	-3	18	18	24	-15	9	9	12	-13	-16	6	6	7	5	42					
54	1	-30	-17	-5	-2	-4	-10	-1	-2	30	3	6	-9	-25	14	6	4	1	8	-4	0	16	11	-15	-15	-1	43				
56	-7	-34	-22	3	-1	-1	-4	12	11	32	-3	-17	-1	-17	-9	5	-5	7	12	12	0	-4	-2	-14	-11	7	-4	49			
58	18	-21	-4	-17	-14	-8	8	9	10	-4	-4	-22	-30	-16	-12	13	5	27	13	6	6	-1	-10	3	13	4	-6	6	34		
60	-18	-24	-16	20	8	11	4	-5	-12	-16	13	2	-2	-16	23	39	8	-3	-1	17	-11	12	15	1	14	21	-6	-7	-16	26	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A3. Zonal Winds From the Surface to 60 km at Kwajalein

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976

KWAJALEIN

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	.008	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-6	-6	-6	-9	-7	3	-2	-3	-6	-9	-6	-7	-5	2	8	11	9	6	2	-2	-6	-9	-9	-11	-12	-11	-2	9	16	23	30
STDV	21	41	53	65	73	69	82	83	82	82	110	141	136	104	124	163	184	179	182	171	159	187	200	242	239	273	232	176	170	176	190
N	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	49	48	50	51	51	51	51	50	50	49	49	46	42	36
2	29	**																													
4	23	52																													
6	24	27	58																												
8	13	21	17	64																											
10	12	15	-5	41	81																										
12	4	19	-13	26	70	88																									
14	7	13	-7	16	56	71	89																								
16	10	34	-1	19	53	66	78	87																							
18	22	36	8	18	41	38	32	34	44																						
20	29	10	2	-26	-14	-17	-13	1	-2	33																					
22	27	17	13	-8	-12	-27	-34	-26	-23	36	74																				
24	18	28	24	13	-4	-21	-34	-39	-31	31	31	77																			
26	-8	38	16	35	19	15	10	-7	5	26	-30	5	55																		
28	-14	28	9	30	22	36	37	22	31	3	-62	-51	-8	69																	
30	-17	12	5	28	19	35	40	26	29	-20	-75	-76	-36	44	59																
32	-15	7	0	23	20	34	49	27	30	-25	-76	-85	-49	24	79	95															
34	-18	-1	-16	8	31	42	47	35	36	-18	-54	-83	-63	-4	51	76	88														
36	-5	-3	-12	7	38	48	49	37	33	-5	-36	-70	-62	-18	28	52	63	92													
38	1	-9	-10	11	46	51	54	41	37	0	-14	-55	-56	-20	18	38	53	78	92												
40	-1	-23	-21	-4	35	44	45	38	36	7	-5	-34	-50	-29	0	14	27	53	72	86											
42	8	-28	-30	-17	22	34	35	33	30	13	10	-16	-42	-36	-15	-6	4	31	31	65	91										
44	2	-24	-21	-15	15	26	26	26	22	2	17	-6	-34	-44	-28	-16	-11	13	34	51	75	87									
46	2	-32	-21	-18	-1	7	-5	14	4	16	28	7	-22	-42	-35	-37	-23	-2	16	29	58	72	86								
48	9	-32	-14	-13	-5	0	-7	6	9	22	35	16	-9	-33	-35	-30	-29	-13	-2	9	36	51	68	88							
50	6	-24	-12	-14	-9	-5	-10	1	4	24	42	30	13	-10	-25	-29	-33	-24	-17	-6	18	35	49	73	85						
52	10	-20	-8	-6	1	-1	-5	5	18	32	52	45	27	-4	-34	-41	-46	-34	-26	-10	17	33	46	69	79	90					
54	17	-18	-8	5	16	15	12	24	33	29	35	29	13	-7	-23	-28	-26	-16	-13	3	22	29	33	41	57	59	77				
56	19	-17	-20	8	14	25	19	26	35	27	7	3	-7	-5	-2	-6	-4	-7	-1	15	30	32	33	38	45	43	64	85			
58	12	-17	-23	20	32	37	30	30	35	29	-7	-2	-2	6	10	4	3	-2	2	13	24	26	28	27	33	37	50	73	90		
60	18	-6	-11	36	48	49	41	38	42	32	-21	-12	-2	29	39	27	18	4	6	17	14	14	8	9	19	26	36	54	75	88	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A3. Zonal Winds From the Surface to 60 km at Kwajalein (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976

KWAJALEIN

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	.088	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-6	-6	-3	-1	2	6	8	9	5	1	0	-4	-5	-6	-8	-10	-13	-17	-19	-18	-13	-6	0	4	7	10	12	16	17	15	12
STDV	22	50	39	54	67	67	78	95	87	63	106	121	88	113	146	155	155	145	118	86	87	107	102	113	134	141	166	175	186	208	224
N	50	50	50	50	50	50	50	50	50	50	50	49	50	49	49	49	49	49	50	50	50	50	50	50	50	50	50	49	41	39	31
2	68	**																													
4	43	50																													
6	25	-14	52																												
8	5	-22	34	78																											
10	-11	-31	7	60	77																										
12	6	-16	10	55	67	85																									
14	15	-17	16	53	59	74	89																								
16	1	-30	15	49	57	69	74	80																							
18	37	5	32	49	31	26	29	35	35																						
20	33	27	46	41	22	8	1	-7	-15	58																					
22	15	27	39	30	24	17	7	0	-14	33	78																				
24	-26	-5	1	-11	6	11	0	-5	0	-5	17	60																			
26	-47	-23	-34	-49	-17	-11	-15	-13	-3	-59	-67	-31	49																		
28	-45	-24	-43	-54	-27	-19	-18	-16	-5	-66	-81	-53	24	93																	
30	-40	-21	-42	-52	-27	-18	-16	-14	-2	-66	-84	-62	12	87	97																
32	-36	-23	-41	-44	-22	-12	-10	-9	0	-62	-86	-68	3	82	93	97															
34	-35	-24	-39	-43	-20	-12	-8	-8	-2	-61	-84	-67	2	79	89	93	97														
36	-34	-25	-41	-45	-32	-19	-14	-13	-3	-55	-82	-76	-14	66	80	86	89	93													
38	-25	-30	-26	-17	-27	-5	-6	-1	-0	-34	-55	-52	-32	21	36	44	47	52	66												
40	-12	-30	-18	16	6	15	10	15	25	24	21	33	22	-22	-24	-27	-29	-23	-18	22											
42	5	-7	10	17	15	15	10	11	22	33	43	59	50	-15	-24	-30	-44	-41	-38	-16	74										
44	-4	2	21	21	33	33	22	9	6	7	45	62	50	-9	-22	-27	-33	-29	-33	-17	48	69									
46	-5	9	18	17	19	15	6	-13	-19	-7	44	52	38	-11	-19	-22	-28	-25	-27	-23	16	39	77								
48	-9	6	13	13	7	9	-4	-22	-30	-3	49	51	40	-8	-20	-24	-29	-26	-24	-19	8	32	65	85							
50	-13	2	4	-5	-10	-14	-16	-36	-47	-5	39	32	28	-6	-14	-14	-17	-14	-11	-20	-6	13	42	68	86						
52	-16	3	-1	-9	-17	-24	-27	-45	-55	-15	35	30	22	-6	-11	-12	-15	-15	-14	-22	-8	10	37	69	79	93					
54	-18	2	-1	-7	-10	-13	-21	-44	-52	-11	44	43	39	-1	-13	-15	-21	-19	-22	-34	-4	16	47	71	82	89	90				
56	-16	4	-4	-11	-11	-12	-17	-42	-52	-10	44	43	37	-8	-17	-18	-23	-21	-26	-30	-7	17	54	73	80	86	86	94			
58	-15	7	6	-11	-13	-14	-28	-50	-49	-13	46	39	30	-14	-22	-19	-24	-26	-20	-25	-4	20	58	71	74	78	77	83	92		
60	-39	12	6	-27	-20	-19	-40	-60	-57	-35	27	30	35	16	7	7	0	-1	1	-6	-2	16	55	61	65	69	65	74	83	92	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A3. Zonal Winds From the Surface to 60 km at Kwajalein (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976

KWAJALEIN

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.008	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-5	-8	-7	-5	-2	0	3	5	6	-8	-12	-12	-14	-15	-19	-22	-26	-28	-30	-32	-33	-33	-35	-36	-37	-35	-30	-23	-13	-3	1
STDV	24	40	39	44	44	60	72	95	66	56	45	61	101	126	122	123	116	91	106	115	125	139	157	165	170	161	142	152	167	165	165
N	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	41	42	41	41	42	42	42	41	41	40	37	36	35	33
2	54	**																													
4	11	58																													
6	-4	13	60																												
8	-24	-14	20	66																											
10	-41	-35	-2	41	84																										
12	-46	-46	-18	21	61	89																									
14	-50	-49	-17	11	56	81	90																								
16	-10	-20	10	27	43	46	46	58																							
18	2	16	39	30	17	13	15	14	16																						
20	23	20	5	12	17	-1	-6	-3	8	36																					
22	-2	-8	-8	4	20	33	38	47	29	-6	32																				
24	-20	-46	-26	-5	27	47	54	58	31	-22	7	79																			
26	-24	-43	-34	-8	25	46	53	55	22	-28	-5	64	93																		
28	-22	-41	-29	-5	29	45	48	50	23	-32	-11	62	89	96																	
30	-22	-38	-21	-2	28	46	47	49	26	-31	-18	50	83	90	93																
32	-20	-44	-16	-3	23	41	44	45	31	-24	-26	30	66	73	75	90															
34	2	-18	8	0	11	17	12	13	33	6	-16	-21	-2	10	14	35	64														
36	11	9	17	13	0	-6	-11	-10	16	33	16	-30	-35	-36	-38	-25	-2	60													
38	24	35	25	7	-19	-21	-23	-24	9	39	7	-22	-41	-45	-47	-45	-36	15	72												
40	31	36	31	23	-18	-25	-23	-28	11	35	19	-16	-38	-44	-45	-44	-37	5	55	86											
42	22	28	28	18	-17	-30	-25	-27	9	35	27	-19	-39	-46	-46	-47	-39	8	57	76	85										
44	4	19	30	21	-5	-16	-14	-18	10	36	29	-18	-35	-41	-41	-44	-31	15	61	71	76	92									
46	4	19	28	17	-2	-10	-9	-9	12	42	17	-24	-41	-49	-51	-54	-41	9	58	72	69	83	94								
48	12	18	20	14	-5	-16	-18	-22	1	34	0	-42	-57	-61	-61	-64	-48	-1	44	69	64	69	75	87							
50	9	21	14	-4	-19	-26	-19	-21	-3	20	-14	-48	-62	-63	-64	-66	-53	-12	24	55	51	56	55	67	85						
52	8	21	-1	-29	-36	-43	-30	-21	-28	-1	-9	-45	-57	-50	-54	-56	-50	-26	-8	5	7	13	5	13	30	57					
54	7	20	16	-17	-30	-34	-22	-10	-16	12	21	1	-24	-24	-31	-35	-37	-31	-14	-22	-14	-5	-17	-16	-14	10	71				
56	10	26	34	13	12	-6	-16	-11	-12	8	23	2	-23	-18	-18	-26	-34	-26	-9	-22	-17	-9	-16	-15	-17	-1	42	76			
58	13	38	55	38	31	11	-12	-6	2	-6	15	9	-17	-15	-11	-11	-17	1	4	-11	-5	-1	-1	-7	-16	-16	18	43	76		
60	17	36	45	30	27	17	-5	-12	-5	-13	-6	-6	-31	-25	-17	-12	-10	20	15	21	20	7	12	10	5	-4	-4	0	35	72	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A3. Zonal Winds From the Surface to 60 km at Kwajalein (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976

KWAJALEIN

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	JAN	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-5	-7	-6	-4	-1	3	7	11	3	-4	-5	-9	-13	-16	-16	-15	-14	-12	-10	-6	0	6	14	18	22	22	22	24	30	37	37
STDV	21	43	38	44	57	72	80	96	83	90	82	113	134	137	124	131	146	158	174	205	232	210	186	157	139	143	165	213	197	191	186
N	36	36	36	36	36	36	36	36	36	35	35	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	33	31
2	48	**																													
4	11	72																													
6	-6	14	24																												
8	-10	1	9	77																											
10	-27	11	27	51	66																										
12	-35	6	23	47	57	90																									
14	-34	-4	28	59	51	58	72																								
16	-16	13	29	55	46	47	51	65																							
18	5	48	45	22	7	24	32	25	38																						
20	-33	-5	26	46	32	57	61	64	51	42																					
22	-39	-17	11	44	30	44	56	67	46	31	86																				
24	-34	-25	0	49	30	37	53	66	38	19	77	93																			
26	-30	-29	-13	44	30	33	48	56	31	5	66	84	95																		
28	-20	-36	-19	33	26	11	22	28	21	-12	36	55	73	83																	
30	2	-33	-26	18	13	-16	-19	-19	-14	-45	-14	-2	17	32	73																
32	13	-12	-20	-13	-1	-29	-35	-43	-24	-47	-47	-42	-29	-13	35	83															
34	20	9	-1	-31	-15	-27	-39	-57	-29	-33	-55	-66	-63	-52	-1	50	85														
36	5	17	13	-42	-23	-11	-23	-48	-22	-15	-41	-63	-70	-63	-38	10	51	84													
38	-11	16	18	-40	-23	11	-1	-30	-17	3	-17	-42	-57	-54	-48	-18	18	55	89												
40	-20	15	17	-23	-5	27	18	-19	-13	7	-3	-23	-39	-35	-36	-16	11	45	79	94											
42	-25	7	12	-11	8	36	32	-6	-11	0	9	-3	-14	-9	-9	2	19	40	66	77	91										
44	-24	2	9	2	21	37	36	2	-11	-5	17	7	0	8	10	17	28	37	53	59	76	94									
46	-19	-7	2	6	26	39	42	12	-1	-7	24	17	15	25	28	31	36	37	44	47	64	84	93								
48	-19	-3	11	20	33	50	54	23	12	6	34	27	26	32	33	26	28	27	35	39	57	77	85	94							
50	-37	-16	6	21	37	54	61	39	25	12	49	42	39	41	38	24	19	12	17	23	37	59	70	81	87						
52	-32	-18	1	23	38	47	56	34	25	8	47	49	46	50	50	34	24	13	13	17	33	58	69	82	86	94					
54	-27	-24	-1	29	36	33	37	25	27	-5	33	38	40	48	63	57	47	31	21	14	29	50	61	74	82	81	91				
56	-22	-14	3	17	25	24	29	21	22	-3	41	40	38	45	61	59	54	39	23	13	24	47	62	76	75	81	87	93			
58	-17	-17	-6	2	10	10	11	0	6	-14	33	28	23	31	50	56	60	48	34	22	29	48	62	70	64	67	72	78	93		
60	-22	-17	-1	3	4	6	3	-3	5	-13	37	35	27	31	46	52	54	46	34	21	29	49	61	70	61	64	69	75	89	95	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A4. Meridional Winds From the Surface to 60 km at Kwajalein

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976

KWAJALEIN

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.008	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-3	-2	-1	-2	-3	-2	1	-1	-3	0	-1	1	0	0	1	1	0	0	-2	-2	1	3	3	2	2	5	4	3	2	0	-2
STDV	17	30	42	43	51	48	58	71	52	41	37	27	20	25	32	32	44	49	47	57	61	68	89	105	114	102	122	119	115	108	139
N	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	49	48	50	51	51	51	51	50	50	49	49	46	42	38
2	43	**																													
4	12	26																													
6	13	29	45																												
8	-22	7	11	54																											
10	-33	-10	-5	34	64																										
12	-30	8	9	22	53	68																									
14	-16	4	1	19	32	40	68																								
16	-20	21	8	33	36	38	42	57																							
18	28	29	41	53	32	34	25	25	33																						
20	-6	9	-1	7	9	9	10	20	29	-11																					
22	17	8	-7	7	-20	-7	-1	6	14	2	25																				
24	9	4	-26	-14	-6	-13	-9	6	-15	-15	-7	-7																			
26	-27	-16	-7	-11	0	2	-1	-4	9	-11	-11	-26	11																		
28	1	-12	34	9	8	10	1	-2	-12	22	-14	-13	3	-17																	
30	16	-4	20	-4	8	11	26	17	3	18	14	-1	8	-7	23																
32	5	11	-7	-6	1	3	1	-6	5	-7	-2	5	20	-3	-21	31															
34	-21	0	6	9	12	8	-4	23	31	-3	5	-14	27	23	9	1	47														
36	-24	-8	1	-6	-14	-1	12	26	25	-10	28	9	11	17	-7	21	15	20													
38	-12	-11	-2	16	5	17	7	10	9	-7	8	5	1	-14	5	6	9	-12	43												
40	-14	-2	3	9	16	24	20	2	13	-4	9	-15	-14	-4	3	14	1	-11	-12	38											
42	-16	-9	-2	-14	1	26	33	29	10	2	12	-2	-5	-9	-3	20	-4	4	1	-13	53										
44	-27	-35	-3	-14	11	28	26	14	-7	-4	-2	-20	1	17	4	29	-14	3	11	5	39	65									
46	-14	-21	-9	-16	7	9	2	-9	-18	-14	-24	-8	22	26	-4	9	0	9	18	-3	7	30	63								
48	11	6	-23	-18	-1	1	5	-1	-22	-17	-2	-7	10	7	-6	13	-3	-5	16	-10	0	18	35	60							
50	12	21	-5	2	3	5	9	-7	-25	-4	-3	-8	7	-24	11	8	-7	-22	-10	2	20	21	16	37	70						
52	-20	-8	-18	-32	-18	-12	-4	0	-21	-42	-3	-22	17	-4	9	-1	-6	-2	26	11	7	10	15	30	47	51					
54	-26	-12	-24	-26	-5	-12	0	1	-6	-38	2	-10	6	7	1	-14	9	-4	13	7	11	12	4	8	23	23	69				
56	-22	-15	-36	-36	-14	-8	-1	-3	-8	-29	-9	-4	-8	-4	-17	-17	20	1	13	7	7	19	3	6	30	28	54	78			
58	-10	-9	-26	-11	-7	-4	-3	-8	-23	-40	4	-13	-3	-3	-18	-3	17	1	20	23	29	17	20	24	51	49	69	62	72		
60	-4	-1	-7	-10	-6	4	16	20	-7	-12	6	2	-2	8	-16	3	11	4	13	4	12	23	29	25	37	39	44	37	44	60	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A4. Meridional Winds From the Surface to 60 km at Kwajalein (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976

KWAJALEIN

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.998	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-3	0	0	0	0	1	2	1	-1	-1	1	0	1	1	2	1	0	0	1	0	0	1	2	3	4	6	7	7	3	-1	-2
STDV	20	27	27	34	47	53	61	76	55	28	24	26	26	22	31	33	35	30	40	49	47	51	53	57	64	69	79	87	95	79	82
N	50	50	50	50	50	50	50	50	50	50	50	49	50	49	49	49	49	49	50	50	50	50	50	50	50	50	50	49	41	39	31
2	43	**																													
4	16	29																													
6	18	-9	27																												
8	29	-7	15	53																											
10	28	4	1	25	62																										
12	18	6	-6	13	45	70																									
14	9	-7	-4	15	35	45	67																								
16	30	15	6	18	47	60	52	49																							
18	8	24	-3	-1	18	20	23	22	7																						
20	11	4	-4	-11	4	2	10	10	-2	-14																					
22	-17	-5	1	-3	-12	17	8	11	-2	-1	-5																				
24	41	-1	14	17	17	23	23	10	17	-10	5	-24																			
26	-12	2	-5	4	-23	-18	-29	-7	2	-15	-15	2	-7																		
28	1	-12	0	6	12	9	23	32	21	-6	27	2	12	-16																	
30	8	19	-4	-9	5	-2	4	3	11	0	25	3	-15	-29	21																
32	8	17	15	-11	-7	-6	-17	-12	0	2	-2	-13	-3	7	-26	23															
34	-6	-3	1	-22	-17	-15	0	-4	-14	-8	-4	-11	1	1	-3	-25	18														
36	-9	-3	13	6	19	-8	19	16	-12	14	-16	6	2	2	10	-4	3	25													
38	9	8	-11	18	19	0	2	11	13	6	0	-14	-14	11	15	31	-4	-44	3												
40	28	24	-2	-34	-8	-13	-15	-1	-14	2	7	-30	15	-15	-13	14	3	-1	-21	4											
42	-2	-3	13	-11	17	20	25	25	37	9	11	-7	11	-21	17	-9	-3	-24	8	-2	18										
44	16	-5	15	9	3	15	18	8	15	-13	3	13	6	-6	28	3	-11	-20	-6	14	-18	11									
46	12	0	6	8	13	-2	5	27	17	-3	17	-19	3	18	1	5	16	-1	8	6	-10	4	23								
48	-24	-16	1	13	18	-15	-13	11	-3	-1	17	-9	-13	34	1	8	-7	-13	4	9	-17	-16	1	59							
50	-39	-10	13	0	-17	-43	-34	-16	-32	-11	-12	-6	-17	25	-22	4	12	-11	1	12	3	-11	6	12	48						
52	-37	8	13	-23	-24	-43	-21	-16	-16	-9	-10	-20	-21	2	-14	7	11	-5	11	4	18	29	-6	-15	0	58					
54	-27	7	15	1	10	-4	2	-3	9	-12	-6	-27	-1	-8	-14	20	25	-6	11	8	12	18	-31	-17	3	28	62				
56	-27	-14	20	13	33	-17	-16	8	-7	1	-9	-34	-3	-7	18	0	20	20	33	15	12	3	-27	-10	16	16	25	64			
58	-8	0	12	14	38	-22	-12	12	8	5	-15	-28	-2	-2	27	8	17	-1	41	29	8	10	-10	7	9	13	19	39	72		
60	0	-8	6	12	45	-2	11	11	6	-6	15	-7	8	-21	16	26	18	-24	39	32	-11	-2	8	0	7	-4	11	25	38	67	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A4. Meridional Winds From the Surface to 60 km at Kwajalein (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976

KWAJALEIN

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.008	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-1	0	0	1	1	1	0	-1	0	0	-1	1	1	1	1	1	0	-1	-1	0	1	3	3	4	4	3		4	4	2	1
STDV	10	24	22	31	37	38	60	69	65	30	22	24	18	20	19	23	30	33	36	46	49	56	51	55	59	58	.5	75	98	99	122
N	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	41	42	41	41	42	42	42	41	41	40	37	36	35	33
2	44	**																													
4	15	32																													
6	-5	-18	38																												
8	-9	-9	34	84																											
10	4	2	18	36	55																										
12	31	20	1	12	20	69																									
14	12	2	-18	1	20	50	70																								
16	3	7	1	23	31	36	38	51																							
18	-19	2	-7	-7	-11	-18	-13	-1	4																						
20	27	15	-12	-2	15	14	7	18	-14	-44																					
22	-15	5	24	9	6	13	9	9	8	34	-35																				
24	-11	-16	16	-2	2	21	15	8	18	12	-16	21																			
26	3	-9	-29	-18	-18	-1	8	8	23	-10	3	0	7																		
28	14	2	-11	0	3	-9	0	20	6	9	-16	20	-37	1																	
30	-12	-11	1	22	14	-19	-45	-40	-23	16	-24	12	-25	-19	25																
32	-19	-10	12	25	16	21	-3	-15	6	5	-8	6	13	0	-36	13															
34	13	3	9	12	-1	-4	3	-7	19	0	-1	-18	25	37	-31	-4	43														
36	8	17	13	-14	-14	-26	-16	-3	1	-25	-13	1	-9	-10	27	-4	-31	7													
38	-11	-11	-11	-14	6	3	-8	9	-27	-6	19	3	6	-14	-4	1	-22	-44	2												
40	-7	-8	-15	7	30	28	17	10	30	-4	2	0	3	21	1	2	7	-17	-38	26											
42	-4	-15	-26	-4	-12	-3	-4	11	43	-1	-10	-11	-5	35	5	12	12	8	-21	-34	21										
44	-18	-22	-10	-8	-16	0	-6	12	2	-1	-6	-3	-6	-1	20	17	16	4	-8	-22	-25	51									
46	5	3	13	-6	-16	1	14	11	-12	10	-26	7	9	-24	27	5	14	10	9	-11	-34	-17	47								
48	32	24	27	-15	-14	-10	17	22	9	-5	-13	-7	15	-13	14	1	1	25	19	-20	-28	-18	14	53							
50	-16	15	6	-42	-33	-31	-10	3	-9	11	-8	-16	22	-26	-23	-8	-19	-4	13	9	-21	-24	0	18	46						
52	-20	10	-2	-14	-5	-7	-6	-9	-5	-3	8	-10	-15	-5	-9	6	-32	-31	-5	12	22	14	-15	-31	-35	33					
54	5	10	13	10	2	17	9	-8	3	-6	18	-16	-17	-4	-22	6	3	-7	-10	-23	2	17	2	-29	-33	2	57				
56	5	-10	21	2	-22	-18	-16	-25	-11	-5	8	-24	-23	-6	-14	-2	-5	-17	-1	-15	-9	20	18	-12	-10	16	31	61			
58	-9	-29	13	32	12	-32	-35	-27	-6	10	-3	6	2	9	-9	21	14	13	2	-7	-10	8	-6	-23	2	0	-18	5	47		
60	-4	-23	-29	13	9	-27	-5	-1	-10	5	8	28	12	18	7	11	29	18	3	-10	-3	8	-10	-17	-2	-26	-33	-37	-29	46	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A4. Meridional Winds From the Surface to 60 km at Kwajalein (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976

KWAJALEIN

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	.000	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-1	0	0	0	1	2	2	0	-2	-1	0	0	0	1	1	1	0	-2	0	0	0	-1	0	2	4	4	3	2	1	0	-1
STDV	23	25	23	42	52	59	83	94	82	31	24	22	20	25	23	30	24	21	39	46	41	36	58	60	67	83	64	72	96	113	99
N	36	36	36	36	36	36	36	36	36	35	35	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	34	33	31
2	33	**																													
4	0	27																													
6	6	10	65																												
8	27	18	45	67																											
10	22	8	3	35	68																										
12	19	-10	-21	15	45	83																									
14	6	-15	-9	28	61	75	87																								
16	12	-1	18	39	57	54	44	52																							
18	8	39	16	7	-8	-3	-3	-11	8																						
20	11	30	6	-2	19	-4	-13	-11	-11	-35																					
22	-3	23	-16	-1	13	16	5	9	26	25	10																				
24	6	4	3	23	15	6	-1	12	11	7	2	2																			
26	13	1	-9	-7	-8	10	13	-1	10	26	-27	-15	4																		
28	17	12	19	5	16	17	3	8	-8	-10	11	-1	0	5																	
30	-6	20	37	13	0	-11	-17	-12	-4	9	16	-5	-22	-31	22																
32	14	10	-27	-31	-25	0	1	-11	8	5	-5	10	1	-9	-34	-1															
34	-16	-35	-10	-3	-7	-5	9	15	-25	-20	-11	-8	23	-12	-10	-13	14														
36	-7	-12	-10	-15	-2	-7	5	3	-16	-14	-9	-12	0	-11	-19	-26	-2	39													
38	-7	-1	17	4	9	17	2	1	1	9	-28	-21	7	8	-2	13	26	17	37												
40	18	11	19	19	14	25	8	-3	9	38	-53	8	-4	15	18	-4	-9	-24	2	38											
42	11	1	-2	-12	-17	-4	6	-8	-19	-11	21	-18	-19	2	0	8	6	-17	11	-39	-4										
44	3	-15	2	18	-3	-6	16	10	22	12	-6	-4	-6	4	-23	-4	16	0	-7	-23	-23	36									
46	-12	17	16	24	9	3	10	8	6	6	17	-2	14	13	-18	7	-14	-20	-24	-26	-21	21	45								
48	4	-11	4	11	30	23	8	17	-5	-16	-2	12	13	5	17	-20	-27	1	0	15	12	-15	-24	25							
50	-1	-15	9	-9	3	-4	-17	-10	-15	-11	-25	14	-20	-11	31	-2	-10	-10	6	32	41	-23	-40	-26	59						
52	-18	-23	10	-2	-5	-22	-27	-16	-30	-14	-30	1	3	-23	17	2	-12	9	6	13	28	-25	-44	-25	20	59					
54	0	-5	0	12	8	-1	-6	-10	-18	-9	-3	-22	17	-11	1	-13	-1	8	6	-12	-11	7	-12	11	8	-7	38				
56	23	25	-7	10	28	30	30	15	18	4	-2	10	4	5	-7	-33	22	10	25	6	18	1	7	8	-6	-21	-8	42			
58	29	17	-32	-16	0	10	16	5	3	-1	15	12	7	-3	2	-32	35	2	6	-1	7	17	14	-16	-25	-17	-22	-3	65		
60	16	-22	-23	-12	-6	8	32	30	11	-17	16	-12	-5	-6	-9	-21	20	-7	-11	-25	-16	37	32	-7	-27	-21	-31	-31	14	67	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A5. Zonal Winds From the Surface to 60 km at Wallops Island

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976
WALLOPS ISLAND, VA
EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.015	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	1	12	21	28	34	31	33	28	23	15	11	11	11	14	16	19	24	28	31	34	37	40	45	50	54	57	59	62	63	68	76
STDV	30	61	90	123	150	120	109	96	88	76	74	81	95	140	170	199	236	254	269	286	279	291	287	300	303	308	290	291	282	282	313
N	44	44	44	43	41	29	25	22	21	20	21	19	22	42	43	44	44	44	44	44	44	44	44	44	44	44	44	44	40	34	25
2	25	**																													
4	31	85																													
6	39	68	94																												
8	34	59	85	94																											
10	-4	31	60	77	91																										
12	-21	16	32	44	68	77																									
14	-21	17	49	62	83	89	87																								
16	-14	4	32	51	67	76	66	68																							
18	-13	-29	5	31	53	72	62	75	75																						
20	-18	-34	-5	12	12	49	52	76	85	93																					
22	-11	-17	5	17	14	55	57	81	89	93	98																				
24	-3	-19	-11	10	21	57	63	72	73	87	92	95																			
26	7	16	14	18	20	39	46	40	42	67	30	38	88																		
28	12	17	19	26	30	45	44	32	24	61	21	32	83	95																	
30	19	18	18	26	32	44	39	27	20	51	17	30	72	89	95																
32	14	18	23	37	41	48	38	25	26	53	18	28	66	82	91	97															
34	11	16	24	38	42	46	36	21	19	52	18	23	59	73	83	90	97														
36	8	16	26	37	40	41	42	29	23	55	22	33	53	63	75	83	90	96													
38	3	11	22	30	31	38	46	32	25	52	20	29	48	55	66	72	79	86	95												
40	1	18	29	33	30	28	36	25	12	36	-2	4	33	46	57	60	68	75	84	93											
42	2	13	23	24	20	9	16	8	-3	23	-19	-17	18	32	40	41	50	58	68	81	95										
44	-3	9	18	18	13	-1	14	9	5	15	-21	-21	13	18	22	23	33	41	53	69	86	96									
46	-2	10	18	17	14	-13	5	4	2	7	-25	-32	5	3	-4	5	15	24	35	52	72	85	95								
48	-2	6	14	13	8	-16	0	7	9	7	-16	-22	1	-5	-5	-5	4	12	23	41	61	76	88	97							
50	-6	0	8	6	1	-20	-7	7	9	14	-2	-11	-1	-8	-14	-11	-4	4	13	30	50	67	80	89	96						
52	-3	7	15	12	5	-13	-3	12	13	13	-6	-12	-3	-14	-10	-11	-4	4	14	31	51	67	79	87	94	98					
54	-1	13	19	16	6	-16	-9	5	5	0	-18	-21	-11	-10	-3	-9	-3	5	15	30	52	66	76	84	91	92	97				
56	-1	24	20	12	5	-16	-10	5	10	11	-11	-17	-6	2	0	-3	-1	6	11	24	47	60	70	76	85	87	93	96			
58	9	23	19	14	15	-9	0	4	1	9	-6	-9	18	18	19	17	17	21	21	32	52	59	63	66	76	78	84	89	93		
60	0	28	31	26	32	-4	-1	9	2	-8	-6	-13	9	9	12	8	10	16	12	18	39	45	52	60	73	78	84	87	90	96	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A5. Zonal Winds From the Surface to 60 km at Wallops Island (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976

WALLOPS ISLAND, VA

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	.015	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	1	9	15	17	21	26	26	22	15	9	4	1	1	2	4	8	12	15	16	16	15	15	12	13	12	10	6	5	2	5	4
STDV	33	53	73	107	115	148	130	91	73	63	43	38	62	52	57	68	86	110	130	136	139	147	154	155	157	161	156	152	140	150	175
N	53	53	53	52	51	49	48	48	46	48	49	49	46	52	53	53	53	53	53	53	53	53	53	53	52	53	53	53	46	39	30
2	40	**																													
4	31	82																													
6	15	63	74																												
8	20	42	66	66																											
10	9	35	54	77	88																										
12	-13	23	41	62	73	85																									
14	-2	39	58	74	71	80	83																								
16	-5	15	38	59	62	73	77	89																							
18	-1	10	33	51	47	63	68	80	90																						
20	0	15	28	30	11	40	39	57	65	74																					
22	-22	12	18	23	7	36	28	32	42	47	67																				
24	11	30	33	38	22	33	21	13	14	18	25	67																			
26	-4	13	23	15	7	17	21	24	29	32	40	74	76																		
28	2	24	28	27	16	23	18	25	27	30	38	63	69	86																	
30	1	18	12	14	17	27	19	33	32	34	37	54	55	69	83																
32	-10	22	15	19	24	34	21	34	26	28	26	44	32	42	58	79															
34	-28	16	12	20	29	31	15	28	19	20	14	27	9	17	29	53	85														
36	-20	15	20	19	28	34	16	33	20	27	29	27	9	12	22	45	78	93													
38	-14	17	22	20	20	32	21	39	28	36	39	20	-13	-1	7	27	66	81	89												
40	-15	21	23	17	14	25	17	37	28	27	31	26	-8	7	11	30	64	78	88	94											
42	-17	21	26	20	17	31	22	43	27	36	43	33	-2	10	11	32	58	72	85	89	94										
44	-15	12	21	21	15	30	20	37	26	37	40	38	4	11	9	21	39	57	71	77	81	91									
46	-12	10	20	24	19	28	24	39	30	40	48	32	-2	13	7	18	34	53	65	75	76	85	95								
48	1	26	34	28	16	24	21	40	29	37	54	29	-1	12	7	13	25	39	52	66	67	78	87	91							
50	-1	30	37	30	17	28	24	42	28	35	54	36	6	16	17	25	30	40	55	62	67	78	86	36	88						
52	-4	24	33	34	29	40	30	48	35	36	53	33	8	21	20	32	38	47	59	64	69	79	85	85	34	93					
54	-6	12	29	30	26	38	25	44	42	40	54	37	6	24	21	28	28	38	48	54	58	67	78	78	78	83	91				
56	-5	16	27	35	37	45	27	43	31	27	39	23	10	4	2	19	19	36	48	48	50	61	72	72	76	79	85	89			
58	-6	17	35	44	34	38	32	50	35	40	44	34	20	28	14	27	30	43	54	51	55	65	73	75	75	77	80	80	85		
60	-11	18	31	52	44	48	49	60	56	60	56	52	59	44	43	43	38	45	52	47	49	58	68	73	73	76	79	81	78	90	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A5. Zonal Winds From the Surface to 60 km at Wallops Island (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976

WALLOPS ISLAND, VA

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	0+15	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	0	5	8	9	10	11	12	10	4	-1	-5	-9	-11	-14	-16	-18	-20	-22	-24	-25	-32	-35	-39	-41	-42	-45	-49	-53	-56	-57	-60
STDV	21	46	58	65	92	106	127	102	62	40	35	26	34	30	36	30	36	37	40	44	44	46	45	56	68	81	86	94	95	98	106
N	46	43	44	44	44	44	45	45	46	45	45	43	42	46	47	47	47	47	47	47	46	46	47	47	47	47	47	47	42	38	27
2	43	**																													
4	29	83																													
6	15	68	92																												
8	-6	52	72	84																											
10	-21	30	65	75	80																										
12	-20	21	55	65	69	91																									
14	-10	24	58	64	62	84	92																								
16	2	38	67	72	69	82	86	93																							
18	-10	33	45	58	58	59	52	55	67																						
20	12	24	43	50	41	42	39	42	49	66																					
22	-11	22	37	44	35	41	33	31	26	48	54																				
24	10	-9	19	30	19	27	22	27	20	25	36	39																			
26	3	20	30	28	24	16	5	8	7	12	22	47	40																		
28	18	13	10	-5	-7	-11	-15	-11	-11	-11	10	41	11	75																	
30	6	1	10	1	0	1	1	8	2	3	21	38	26	47	63																
32	4	5	7	7	11	18	10	12	13	25	31	36	32	41	36	53															
34	8	16	17	19	22	14	8	13	14	16	23	30	33	41	41	46	66														
36	3	23	25	20	18	18	2	1	3	-9	9	45	20	46	50	39	26	58													
38	18	29	23	9	3	6	-3	-9	-10	-5	7	27	-6	41	55	39	29	27	63												
40	-7	12	22	12	17	25	19	13	9	16	11	39	30	51	53	30	33	50	59	56											
42	-23	-9	1	-2	-5	17	17	18	10	32	20	57	19	35	46	32	19	27	47	35	69										
44	-18	-22	-14	-17	-25	6	5	5	3	25	-5	30	9	24	21	8	21	21	28	16	26	57									
46	1	3	-1	-9	-15	-10	-17	-16	-15	-0	-10	16	24	23	19	21	26	33	40	22	25	9	50								
48	10	5	-1	-9	-7	-9	-16	-18	-12	-4	-9	13	10	35	31	27	27	33	41	27	22	2	34	83							
50	14	9	-5	-17	-14	-10	-11	-13	-6	0	-1	0	-4	31	27	14	24	16	14	18	16	1	36	72	31						
52	16	22	0	-16	-16	-13	-12	-15	-10	0	-4	3	-13	21	21	-2	3	-2	9	26	11	-3	18	56	67	82					
54	31	32	5	-6	-10	-31	-30	-25	-20	-5	-5	2	-11	9	9	-16	-16	-9	-10	-2	-14	-26	-11	21	25	33	56				
56	37	35	16	10	5	-18	-18	-7	0	-9	-10	-19	-5	-2	-12	-26	-22	4	-15	-22	-20	-24	-10	1	4	7	27	71			
58	29	33	36	28	16	-1	2	13	20	12	8	-17	-6	-19	-16	-30	-21	-6	-32	-19	-29	-39	-10	-1	-7	-6	4	37	58		
60	-16	24	15	1	19	-1	4	3	5	-18	-34	-29	-47	-31	-12	-27	-54	-31	-24	-21	-16	-39	-35	-21	-20	-5	8	34	41	53	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A5. Zonal Winds From the Surface to 60 km at Wallops Island (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976

WALLOPS ISLAND, VA

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.115	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	0	5	9	13	16	21	24	23	17	9	5	4	4	6	8	10	15	20	24	25	28	33	38	44	47	51	54	56	57	59	56
STDV	31	63	96	104	105	133	147	130	95	67	55	54	59	76	92	117	129	150	171	178	191	201	209	228	230	239	244	240	219	264	236
N	43	41	42	43	41	40	39	39	39	38	38	39	38	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	40	34	23
2	46	**																													
4	37	90																													
6	32	82	96																												
8	19	70	83	91																											
10	-7	48	59	69	88																										
12	-15	43	55	68	86	92																									
14	-8	36	48	62	80	81	90																								
16	5	39	46	62	75	74	78	90																							
18	11	42	42	51	65	60	65	83	90																						
20	22	43	42	47	61	51	56	73	84	91																					
22	21	37	34	40	57	53	53	67	77	82	93																				
24	15	30	29	39	49	48	48	61	66	68	71	88																			
26	20	27	20	25	10	6	11	17	20	18	25	46	67																		
28	20	25	14	18	3	5	2	8	13	8	12	31	49	89																	
30	18	26	14	17	-11	-6	-10	-7	-1	-6	1	18	34	60	93																
32	18	27	15	15	-17	-7	-11	-12	-7	-12	-4	13	28	74	94	94															
34	25	25	11	9	-16	-6	-10	-14	-8	-11	-4	12	26	71	81	90	95														
36	22	29	13	12	-11	0	-2	-6	1	1	9	26	35	70	77	85	92	96													
38	19	30	17	14	-7	6	3	-4	3	1	11	26	28	61	65	75	86	91	95												
40	21	30	15	8	-1	9	9	-1	6	6	19	30	25	53	54	61	75	82	85	94											
42	19	25	9	0	-4	4	5	-3	6	6	20	29	22	50	50	57	70	78	84	90	96										
44	23	23	6	-3	-8	-1	0	-7	2	5	21	29	20	48	47	56	68	76	82	88	93	97									
46	21	26	9	-1	-5	1	3	-3	5	12	27	36	24	49	46	55	68	72	80	84	90	94	97								
48	27	25	9	-1	-5	-3	-3	-9	3	8	27	35	21	47	40	49	61	67	74	80	87	91	96	97							
50	27	17	0	-9	-6	0	-1	-7	9	13	31	39	26	45	40	47	60	67	75	79	85	90	94	95	97						
52	28	20	2	-4	-2	4	3	-2	14	19	36	42	30	47	41	47	59	66	74	77	84	87	92	94	94	97					
54	28	25	5	-1	0	3	5	2	16	25	43	46	38	44	37	43	54	59	68	71	80	82	88	92	92	94	96				
56	27	25	4	-2	-2	-0	-4	0	15	24	45	45	31	45	29	39	50	55	65	70	76	80	86	89	92	93	93	98			
58	34	27	7	-2	-1	-4	-1	-10	6	18	41	39	25	39	23	36	48	55	64	65	71	74	82	84	86	88	91	93	95		
60	33	13	-2	-5	-1	2	2	-1	26	31	52	47	25	19	4	14	37	46	54	62	71	79	83	84	84	89	88	91	90	94	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A6. Meridional Winds From the Surface to 60 km at Wallops Island

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976
WALLOPS ISLAND, VA
NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.015	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-1	0	0	1	2	2	0	0	1	2	1	2	1	3	4	3	3	3	5	7	11	14	18	18	13	18	19	18	17	16	18
STDV	38	72	95	134	164	192	172	114	82	57	48	46	70	79	112	110	129	149	120	140	162	166	154	176	178	209	202	193	215	216	172
N	44	44	44	43	41	29	25	22	21	20	21	19	22	42	43	44	44	44	44	44	44	44	44	44	44	44	44	44	40	34	25
2	60	**																													
4	27	78																													
6	5	58	94																												
8	0	54	88	95																											
10	-1	49	88	90	97																										
12	0	40	81	84	90	94																									
14	9	44	82	85	89	93	94																								
16	-5	36	75	80	81	86	85	96																							
18	30	43	67	69	67	72	70	85	86																						
20	19	27	56	64	58	59	55	76	80	92																					
22	23	19	34	37	40	44	42	58	56	72	83																				
24	4	-9	-11	-1	6	10	12	31	27	42	57	91																			
26	0	-4	-9	-3	4	6	5	30	24	45	55	87	96																		
28	6	-5	-15	-12	-3	-9	-9	-1	-13	17	26	61	82	83																	
30	4	-10	-22	-18	-8	-11	-12	-10	-29	-8	1	34	67	78	83																
32	-17	-24	-26	-16	-6	-13	-14	-16	-30	-12	-5	27	63	68	77	92															
34	-19	-25	-26	-16	-10	-18	-12	-17	-25	-25	-14	13	51	57	65	82	92														
36	-15	-15	-20	-15	-5	-16	-16	-15	-16	-13	-6	15	38	51	53	81	85	83													
38	-7	-2	-7	-3	4	-8	-12	-15	-16	-13	-10	9	31	48	61	78	77	78	88												
40	-13	-13	-16	-11	-5	-22	-24	-22	-22	-13	-14	5	25	39	57	70	74	75	85	92											
42	-17	-9	-12	-5	-3	-21	-20	-14	-16	-9	-15	-10	11	31	49	60	62	64	71	82	91										
44	-7	-8	-19	-15	-15	-29	-22	-17	-20	-11	-11	-24	1	22	43	55	54	54	57	71	78	91									
46	-9	-1	-13	-12	-13	-24	-16	-29	-33	-24	-34	-36	-20	9	30	45	45	47	48	67	73	81	92								
48	-6	5	-9	-11	-13	-22	-19	-17	-13	-13	-27	-38	-23	8	17	26	27	29	31	55	64	73	84	87							
50	-15	-3	-10	-7	-6	-16	-16	-8	0	-1	-10	-28	-28	-5	10	19	22	23	29	52	59	67	76	78	87						
52	-10	-1	0	6	5	-9	-8	-3	3	2	-6	-23	-25	-9	0	8	10	10	14	47	50	61	68	69	80	92					
54	-12	0	-4	2	1	-14	-5	-4	2	3	-6	-21	-16	0	11	17	11	9	17	41	47	62	70	67	68	83	88				
56	-5	5	2	8	6	-21	-11	-17	-14	-13	-20	-19	-15	2	10	16	10	10	19	39	47	62	67	68	67	76	83	94			
58	7	15	15	19	8	-19	-9	-15	-9	-10	-15	-19	-23	-4	-6	9	3	0	9	28	37	52	61	61	61	65	76	77	88		
60	-29	6	3	7	-11	-45	-39	-44	-10	-31	-14	-38	-36	-37	-36	-28	-28	-14	-1	6	16	28	27	28	26	46	64	61	66	86	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A6. Meridional Winds From the Surface to 60 km at Wallops Island (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976

WALLOPS ISLAND, VA

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.315	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	1	-1	-2	-2	-3	-3	-6	-3	-3	-1	0	-1	-1	0	1	2	2	1	1	2	2	2	5	5	3	5	6	7	8	8	6
STDV	31	64	89	114	136	134	131	98	68	36	42	21	35	32	39	46	47	43	53	56	61	73	72	72	76	64	74	71	91	83	87
N	53	53	53	52	51	49	48	48	48	48	49	49	46	52	53	53	53	53	53	53	53	53	53	53	52	53	53	53	46	39	30
2	45	**																													
4	18	86																													
6	7	69	82																												
8	-9	65	83	84																											
10	-10	53	73	75	95																										
12	-8	41	67	71	83	87																									
14	-13	42	67	75	84	83	82																								
16	-12	37	60	61	77	76	72	49																							
18	-20	12	35	40	53	58	56	71	60																						
20	5	18	13	13	20	20	19	24	34	41																					
22	-23	6	22	16	33	22	19	26	30	44	38																				
24	2	41	41	29	35	32	23	28	34	22	27	44																			
26	-5	9	16	16	16	2	1	11	15	24	35	49	27																		
28	-12	17	12	14	18	3	7	19	16	11	34	42	13	64																	
30	-6	9	15	24	28	14	9	24	32	29	29	36	-15	43	72																
32	-2	11	25	29	36	26	22	21	24	30	15	37	1	23	31	63															
34	7	-8	-3	5	4	5	17	8	8	17	3	2	-34	-22	-2	25	53														
36	-4	5	12	17	8	11	12	25	20	28	-8	16	-29	-19	2	26	34	49													
38	18	13	8	23	7	1	5	8	0	-2	5	-1	-30	-4	7	23	29	48	59												
40	5	2	-5	-1	0	-2	-4	-3	1	3	17	2	-28	-18	7	26	30	62	36	60											
42	-7	11	6	8	16	19	18	24	20	19	17	14	-14	-11	21	31	36	49	51	43	61										
44	-16	32	26	24	30	20	19	24	18	13	6	11	5	-9	7	7	24	34	45	44	38	67									
46	0	26	25	23	32	13	10	17	11	10	1	-3	-10	-5	9	16	25	29	44	45	41	44	76								
48	3	30	30	30	32	21	18	29	14	6	6	1	11	-7	8	13	35	24	36	43	51	43	56	79							
50	-3	20	21	22	32	28	13	26	21	2	5	16	4	-6	15	25	33	20	38	31	45	47	51	41	56						
52	2	2	-3	2	6	1	-8	4	5	-7	-1	-6	-13	15	19	17	5	10	25	43	41	49	38	38	32	50					
54	9	6	2	-2	6	3	5	11	6	-9	2	-4	-5	8	20	17	-1	15	16	29	38	36	41	34	33	41	58				
56	-4	7	15	13	25	23	31	29	29	17	18	25	2	-2	28	39	27	14	17	18	26	35	41	24	31	47	19	72			
58	-24	9	24	28	46	50	42	49	50	24	17	21	24	10	31	28	38	3	0	4	18	26	37	21	35	47	25	53	59		
60	-31	10	29	34	41	39	23	29	26	23	30	32	54	11	31	26	30	17	-10	2	17	24	23	4	24	39	16	19	16	55	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A6. Meridional Winds From the Surface to 60 km at Wallops Island (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976
WALLOPS ISLAND, VA
NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.015	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	0	-1	-1	-1	-2	-2	-1	-3	-2	-1	0	0	0	0	1	1	1	1	0	1	1	2	4	6	6	5	4	3	5	3	2
STDV	37	49	61	85	107	134	157	124	64	28	15	15	14	18	16	21	34	25	28	37	36	43	43	46	49	59	75	94	82	93	127
N	45	43	44	44	44	44	45	45	46	45	45	44	42	46	47	47	47	47	47	47	46	46	47	47	47	47	47	47	42	38	27
2	59	**																													
4	35	60																													
6	26	59	96																												
8	19	40	83	91																											
10	12	34	75	82	92																										
12	6	29	68	73	78	93																									
14	2	36	68	73	72	87	92																								
16	11	37	72	76	72	83	85	93																							
18	13	30	49	52	60	73	72	78	90																						
20	25	49	45	48	46	56	58	64	69	76																					
22	6	23	36	34	32	40	46	54	57	45	68																				
24	5	16	19	15	6	11	16	21	24	23	31	56																			
26	15	29	23	21	17	12	5	5	8	2	21	23	42																		
28	-12	2	10	15	9	-2	5	5	11	5	3	-5	13	-2																	
30	20	6	-8	-3	1	-3	4	-1	3	-1	-12	-7	-12	-14	8																
32	-12	-21	-5	-1	-6	4	6	2	9	19	17	24	36	18	-18	-2															
34	-23	-21	-7	-7	-2	11	11	18	6	30	21	30	18	1	-3	-14	05														
36	28	21	22	19	13	27	22	27	19	29	27	5	26	8	23	-3	-16	24													
38	-7	22	16	24	22	19	25	15	18	6	15	-4	13	14	22	6	-1	-27	15												
40	-9	5	-7	-7	-9	-12	-5	-4	-7	-20	-16	-6	12	24	-3	12	0	-18	-14	56											
42	3	7	10	14	21	1	-18	-25	-23	-23	-38	-21	-18	20	-6	9	1	-23	-25	3	40										
44	8	7	10	15	19	6	-5	-2	-4	-8	-19	-4	6	3	-1	3	0	-5	7	3	14	49									
46	-5	-6	24	29	24	24	22	23	24	22	8	12	39	6	-6	14	31	13	3	9	6	16	59								
48	24	13	31	30	19	15	20	24	20	12	14	17	20	4	-2	40	10	17	10	-1	-1	-2	35	44							
50	27	11	14	5	-3	-13	-19	-5	-1	-3	-6	0	0	-5	7	14	-16	23	14	-16	4	-1	14	8	55						
52	26	13	-5	-9	0	-19	-31	-25	-14	-8	-12	-19	-11	3	16	-1	-21	-6	13	-6	7	24	8	9	9	59					
54	7	17	-13	-15	-3	-11	-20	-16	-11	-6	-8	-7	-9	7	5	-7	-24	-7	5	-12	8	24	-6	-22	-21	24	77				
56	-25	5	-6	-2	6	5	-6	-5	2	-2	-14	-1	-3	20	5	-10	-3	7	-3	7	15	33	16	-8	-33	-2	28	66			
58	-13	10	15	19	17	13	4	9	16	4	-11	12	7	2	20	-16	-12	8	-6	14	33	40	31	4	-18	8	11	30	70		
60	29	17	12	14	22	12	3	-2	0	11	7	-13	-14	-31	36	-14	-29	-2	26	9	-17	22	26	-11	-11	17	26	17	17	63	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A6. Meridional Winds From the Surface to 60 km at Wallops Island (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976

WALLOPS ISLAND, VA

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	.015	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-1	-1	-1	0	-1	1	0	0	0	0	-1	0	1	2	2	3	4	4	2	2	4	6	6	9	8	9	8	9	9	9	9
STDV	36	58	77	101	123	161	149	118	77	45	31	27	27	34	36	45	47	54	61	57	55	72	62	80	84	91	77	82	93	110	99
N	43	41	42	43	41	40	39	39	39	38	38	39	38	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	40	34	23
2	44	**																													
4	36	78																													
6	41	63	94																												
8	39	52	84	93																											
10	31	46	76	84	95																										
12	28	35	65	72	82	91																									
14	21	26	52	60	72	76	86																								
16	20	8	37	47	56	60	69	79																							
18	3	-3	32	41	41	53	70	69	73																						
20	0	-22	-1	8	15	25	43	40	45	69																					
22	2	-13	-6	-1	7	13	28	29	23	45	61																				
24	-1	-28	-20	-11	-8	-2	16	15	11	37	54	76																			
26	-9	-12	-12	-12	-8	-2	15	24	33	32	26	31	44																		
28	-3	-20	0	7	7	2	-1	10	21	19	23	25	32	61																	
30	-16	-14	-17	-11	-15	-4	-16	-19	-18	-12	-2	8	35	32	53																
32	-8	-15	-21	-17	-22	-20	-19	-22	-19	-4	19	29	34	33	47	69															
34	-20	-3	-6	-3	-11	-14	-19	-16	-24	-7	-10	5	24	21	30	59	74														
36	-20	-3	-6	-4	-7	-11	-18	-11	-24	-11	-13	-5	-6	11	19	43	53	71													
38	-2	-4	-13	-12	-15	-16	-22	-23	-33	-31	-25	-6	-5	-4	-1	19	42	42	59												
40	-5	7	-13	-12	-15	-13	-19	-24	-36	-39	-26	5	27	-2	1	46	51	47	35	55											
42	-6	2	7	14	17	20	7	-5	-8	-5	-4	19	49	32	30	50	32	33	14	13	62										
44	4	1	2	12	12	14	5	-5	-9	0	11	18	37	-2	7	34	15	17	22	13	38	61									
46	-8	-11	-14	-5	-4	5	-3	-26	-20	-3	9	14	20	-6	3	25	21	9	17	12	22	37	72								
48	-12	-9	-8	-3	0	12	7	-16	-11	8	-7	-8	-2	1	10	20	18	16	27	34	18	30	43	65							
50	-6	-19	-8	-4	-1	13	18	2	3	18	5	7	23	29	27	16	3	-9	3	16	7	36	41	49	76						
52	3	-32	-32	-28	-23	-12	0	-5	8	11	21	23	26	28	21	6	13	-19	-8	20	10	24	17	23	46	71					
54	5	-27	-19	-8	-3	10	16	8	22	24	31	6	11	19	15	27	24	-5	16	24	20	30	32	41	38	41	59				
56	-10	-29	-17	-14	-12	-3	2	-12	1	13	15	4	1	-7	-8	20	12	-10	12	20	3	22	44	58	46	48	44	75			
58	-35	-35	-21	-21	-23	-16	-19	-28	-22	5	12	15	15	-2	6	37	36	23	15	18	17	29	38	55	37	41	29	43	79		
60	-43	-5	15	16	17	29	17	5	10	32	38	27	12	1	9	-4	6	9	-6	9	-8	24	38	51	56	63	27	24	41	66	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A7. Zonal Winds From the Surface to 60 km at Churchill

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976

FORT CHURCHILL, MANITOBA

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	.335	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	4	4	7	10	12	13	14	15	16	17	17	17	20	25	24	25	24	25	25	28	30	26	31	35	35	38	38	39	37	27	30
STDV	32	64	98	132	140	103	99	106	129	137	170	199	207	248	281	305	301	308	324	337	353	366	395	410	427	447	440	435	418	330	324
N	50	50	51	52	52	51	51	50	49	46	44	43	30	52	53	52	53	53	53	53	53	49	52	53	52	53	52	53	49	44	43
2	54	**																													
4	33	81																													
6	23	67	95																												
8	18	59	87	96																											
10	17	45	71	82	92																										
12	15	36	55	64	76	91																									
14	5	15	34	43	60	80	91																								
16	0	6	23	30	48	68	82	96																							
18	4	10	18	16	26	54	72	86	92																						
20	3	5	15	15	24	50	66	80	87	97																					
22	4	6	12	11	21	46	62	74	82	95	98																				
24	1	-6	-5	-7	5	36	55	68	76	90	94	98																			
26	-1	6	13	17	30	46	59	66	74	82	87	90	92																		
28	-2	5	10	14	28	44	59	65	73	81	86	89	90	99																	
30	2	4	9	12	25	43	56	64	73	76	81	84	84	96	98																
32	6	10	9	10	22	38	49	55	65	70	75	77	79	92	94	97															
34	5	12	11	12	23	38	46	52	58	66	71	74	76	88	91	94	98														
36	6	12	9	10	20	35	40	45	51	55	60	63	64	79	83	88	93	96													
38	3	10	4	7	15	29	32	37	42	44	50	54	57	73	76	81	89	92	98												
40	3	15	6	9	16	25	23	23	26	27	34	37	41	60	63	70	78	83	91	95											
42	1	12	1	4	8	9	1	8	11	10	19	23	26	42	46	54	66	70	81	86	95										
44	10	17	6	7	10	14	6	6	7	8	16	20	26	37	40	49	62	67	75	82	90	96									
46	6	7	-1	0	3	7	-3	-2	0	2	9	13	21	30	31	40	53	58	67	74	83	90	96								
48	15	9	0	-1	0	3	-8	-7	-8	-6	0	5	15	23	23	32	46	52	61	68	78	85	92	97							
50	13	9	-1	-4	-6	0	-11	-9	-10	-7	-3	1	14	19	17	25	41	46	55	62	71	78	86	91	96						
52	11	4	-5	-7	-8	1	-10	-7	-9	-7	-3	1	13	14	13	22	37	43	53	59	67	76	82	88	93	97					
54	14	1	-7	-9	-9	-4	-16	-8	-8	-9	-5	3	12	7	6	14	27	31	41	49	56	68	75	82	88	92	95				
56	12	2	-14	-13	-13	-13	-26	-20	-22	-25	-20	-14	1	2	0	9	23	28	39	48	57	73	76	80	86	90	92	95			
58	15	-2	-18	-18	-16	-10	-12	-11	-11	-21	-21	-16	15	6	-2	5	18	20	27	38	42	53	58	65	75	80	81	86	93		
60	15	-5	-23	-22	-19	-13	-14	-13	-12	-17	-14	-7	28	12	5	10	23	26	32	43	44	51	58	68	75	79	79	85	91	94	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A7. Zonal Winds From the Surface to 60 km at Churchill (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976

FORT CHURCHILL, MANITOBA

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	.935	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	0	4	7	10	13	17	10	7	5	3	1	-1	-2	-3	-5	-5	-5	-3	-2	-1	2	6	7	10	11	13	12	12	12	11	13
STDV	32	57	84	113	133	131	92	57	49	45	43	41	47	48	52	70	80	93	103	112	121	138	138	149	169	180	174	192	186	207	202
N	44	43	45	45	45	45	45	45	45	45	44	41	37	45	45	45	45	45	45	45	45	45	45	45	45	45	44	43	38	30	
2	28	**																													
4	8	90																													
6	-7	73	93																												
8	-8	59	82	95																											
10	-9	46	72	86	95																										
12	-11	40	64	78	86	95																									
14	-6	29	47	60	69	77	89																								
16	-10	31	48	61	66	73	85	93																							
18	-7	18	26	39	44	51	56	79	90																						
20	-3	18	23	36	41	49	63	68	80	93																					
22	7	20	19	24	24	28	37	45	59	76	87																				
24	-12	3	6	11	10	11	17	21	36	53	69	87																			
26	-12	-8	-5	3	10	9	7	8	22	39	52	65	76																		
28	-7	0	-2	-1	1	-1	-2	1	12	27	40	64	74	76																	
30	-3	16	13	9	10	8	6	6	18	26	39	65	77	75	90																
32	-4	9	6	3	4	-1	-4	-6	5	10	23	49	62	69	84	91															
34	-4	16	7	3	3	-3	-5	-5	7	13	24	47	56	68	84	87	91														
36	4	26	17	9	4	-5	-9	-12	1	6	20	48	56	56	75	85	87	90													
38	-7	19	14	7	3	-6	-7	-9	5	8	20	41	51	54	72	78	81	87	91												
40	-4	25	20	11	3	-5	-9	-13	2	4	16	39	48	44	67	74	74	82	90	93											
42	-6	22	16	8	1	-9	-13	-16	-3	0	12	34	45	45	64	71	73	83	88	92	91										
44	-1	13	7	0	-5	-16	-20	-22	-10	-6	7	27	39	43	64	67	70	79	84	92	91	93									
46	-7	16	10	5	0	-9	-12	-19	-5	-1	14	33	45	39	55	58	59	67	76	87	86	97	91								
48	-2	25	19	13	7	-3	-10	-16	-3	1	16	34	46	40	57	60	60	69	77	86	88	88	90	95							
50	0	22	18	13	9	-6	-11	-17	-4	2	14	32	42	36	55	56	55	64	73	84	87	85	88	92	94						
52	-5	21	18	13	6	-5	-12	-17	-3	-1	9	27	38	33	52	52	53	63	69	81	84	83	86	92	91	95					
54	-7	18	11	4	-4	-12	-17	-23	-12	-10	1	17	29	20	41	39	41	56	61	77	80	79	84	91	90	93					
56	-7	18	13	5	-1	-8	-14	-20	-8	-9	2	16	24	12	37	36	36	49	57	74	79	75	81	89	86	90	89	93			
58	-21	14	15	12	6	-5	-12	-18	-5	-4	5	16	28	22	38	31	30	41	42	65	64	64	70	78	79	82	84	84	87		
60	-34	-12	-10	-5	-5	-16	-21	-23	-12	-6	7	27	42	40	54	41	42	53	43	62	61	65	71	79	78	85	84	82	84	92	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A7. Zonal Winds From the Surface to 60 km at Churchill (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976

FORT CHURCHILL, MANITOBA

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	.035	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	1	3	5	8	12	15	13	10	6	3	-1	-3	-5	-7	-9	-10	-11	-14	-14	-15	-18	-20	-22	-24	-27	-30	-33	-34	-38	-41	-46
STDV	42	69	76	92	132	163	115	71	48	34	26	21	23	21	21	21	26	33	30	23	31	41	41	46	50	78	61	68	83	98	83
N	30	30	30	30	30	30	30	30	30	30	30	28	27	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	26
2	62	**																													
4	51	93																													
6	44	78	93																												
8	26	59	77	92																											
10	15	44	64	82	97																										
12	13	44	62	80	91	94																									
14	23	45	65	79	86	89	93																								
16	16	40	58	70	74	76	84	94																							
18	19	39	53	58	59	59	64	79	87																						
20	13	36	52	57	59	58	59	70	79	88																					
22	6	11	22	31	33	37	43	55	66	64	79																				
24	10	16	23	25	21	24	31	43	48	66	68	61																			
26	-1	-7	-1	5	6	12	17	32	38	45	37	34	48																		
28	-14	-31	-27	-17	-10	0	9	14	15	26	20	27	57	34																	
30	-36	-20	-8	0	18	29	29	28	29	32	42	46	28	11	22																
32	-29	-40	-21	-1	13	21	31	25	25	12	17	32	12	36	20	44															
34	-28	-44	-34	-19	-7	0	4	7	13	11	5	17	31	42	36	-12	44														
36	-2	-30	-31	-24	-10	-1	6	10	10	-7	-16	6	11	35	33	-23	31	55													
38	-31	-50	-56	-50	-41	-27	-12	-13	-9	-9	-16	1	25	30	46	28	35	18	42												
40	-23	-27	-22	-20	-23	-13	-3	2	5	5	8	19	28	20	43	47	34	-1	-9	55											
42	-15	-14	-9	8	11	17	29	19	22	-1	11	29	-3	32	13	20	54	2	20	43	39										
44	-10	-19	-3	17	27	33	43	41	37	24	15	22	34	63	49	9	53	56	61	36	15	41									
46	-4	8	17	29	34	39	52	52	46	25	3	-1	5	41	23	-11	24	23	40	34	15	31	61								
48	-8	-7	-12	-5	4	13	21	23	19	-1	-17	-17	-18	17	2	13	24	11	44	43	17	22	26	61							
50	-25	-17	-11	1	16	28	31	34	35	12	11	13	4	6	-5	27	29	24	48	22	1	10	17	27	68						
52	0	3	-5	-4	3	9	15	16	11	-15	-19	0	-2	3	-15	-9	6	24	50	18	-3	4	7	23	48	60					
54	-23	-17	-19	-19	-15	-10	1	0	6	-13	-5	4	4	-4	8	3	13	25	33	30	26	27	8	6	27	42	63				
56	-9	-4	-5	-4	-5	1	15	17	16	-3	-8	6	22	30	8	2	23	43	40	42	35	34	41	35	33	34	65	66			
58	-20	-4	-1	-5	-10	-8	6	13	21	13	19	29	43	23	19	-16	-4	39	29	25	31	12	28	15	-6	5	32	59	57		
60	-31	-25	-15	-22	-32	-39	-21	-21	-21	-12	-21	-23	4	21	13	-14	15	21	24	32	15	-9	37	28	4	-18	16	20	22	62	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A7. Zonal Winds From the Surface to 60 km at Churchill (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976

FORT CHURCHILL, MANITOBA

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	.035	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	2	5	8	10	12	16	15	14	12	10	10	10	10	11	13	16	18	21	24	28	31	34	38	41	44	45	45	42	43	40	39
STDV	40	76	70	82	113	119	86	69	47	49	40	63	74	73	81	83	89	96	108	110	118	107	114	123	131	136	173	158	186	188	167
N	51	52	52	52	52	52	52	52	52	51	50	45	43	52	52	52	51	52	52	51	48	51	52	51	52	52	52	52	52	46	40
2	67	**																													
4	68	86																													
6	26	53	88																												
8	17	41	65	83																											
10	17	48	70	87	87																										
12	21	49	69	78	75	90																									
14	6	36	60	68	69	79	92																								
16	9	33	53	58	63	67	81	88																							
18	5	23	40	44	53	53	64	72	85																						
20	14	29	40	38	49	42	52	57	76	87																					
22	6	16	19	19	28	16	24	31	53	61	77																				
24	3	9	9	8	21	8	14	20	43	50	69	94																			
26	8	13	15	15	26	17	20	19	38	47	71	77	78																		
28	10	9	10	11	20	16	22	18	38	46	68	74	74	94																	
30	11	3	2	5	14	9	14	9	30	36	56	7.	66	86	93																
32	8	4	0	0	14	7	11	6	24	29	49	56	51	86	90	92															
34	11	9	11	12	19	17	22	19	33	38	54	57	46	81	88	90	92														
36	12	4	1	0	8	7	9	7	24	30	49	54	42	75	92	85	87	94													
38	15	2	-2	0	10	8	9	5	23	27	36	51	39	72	79	86	85	89	92												
40	10	3	-2	-5	0	1	6	3	15	17	30	40	19	61	67	75	78	84	88	91											
42	8	2	-5	-8	-4	0	3	-1	11	20	24	32	21	45	51	57	62	72	78	7.	86										
44	13	4	-4	-8	1	-2	-1	-3	12	15	25	37	29	51	58	67	69	74	77	3.	82	86									
46	7	-15	-26	-29	-12	-20	-17	-14	5	10	19	31	20	46	55	66	67	68	76	81	79	76	87								
48	-3	-16	-24	-27	-13	-19	-16	-9	8	14	18	31	23	37	43	47	53	56	65	65	68	74	79	83							
50	3	-3	-4	4	14	9	10	13	22	26	21	21	12	33	38	37	43	51	53	52	62	63	62	68	79						
52	2	-14	-26	-21	-8	-13	-17	-13	-6	-2	6	25	16	24	26	34	36	42	52	57	61	62	62	74	78	75					
54	-11	-19	-20	-17	-14	-18	-18	-14	-1	-3	6	18	10	23	29	31	29	42	49	48	55	59	56	68	66	64	74				
56	-13	-11	-6	4	6	3	6	11	20	22	19	20	3	16	19	18	24	37	44	40	48	57	48	49	57	68	58	72			
58	-19	-15	-10	10	23	16	19	23	31	19	21	21	12	24	23	27	34	36	41	38	52	48	47	45	55	68	58	59	77		
60	-19	-28	-23	-6	5	-1	2	5	15	15	19	31	24	26	29	51	43	49	47	61	62	62	68	63	57	55	64	52	54	71	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A8. Meridional Winds From the Surface to 60 km at Churchill

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976

FORT CHURCHILL, MANITOBA

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.035	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-2	-5	-5	-6	-7	-6	-7	-7	-8	-9	-9	-11	-13	-16	-17	-17	-19	-18	-17	-15	-15	-18	-12	-8	-7	-4	-2	0	1	-3	-7
STDV	35	73	93	124	133	145	98	101	102	118	140	147	165	192	216	225	265	265	280	296	306	303	309	309	329	289	292	267	248	246	245
N	50	50	51	52	52	51	51	53	49	46	44	43	38	52	53	52	53	53	53	53	53	49	52	53	52	53	52	52	49	44	43
2	43	**																													
4	25	87																													
6	13	66	93																												
8	4	56	84	95																											
10	3	59	83	90	92																										
12	4	55	72	74	77	83																									
14	2	47	61	63	65	67	97																								
16	-3	44	56	56	59	60	90	96																							
18	-7	35	45	43	45	48	82	91	97																						
20	-10	16	29	30	34	35	68	76	83	87																					
22	0	24	33	30	32	35	67	76	85	91	91																				
24	-6	19	27	24	24	27	60	72	82	88	94	98																			
26	-21	9	13	13	14	19	25	35	44	52	58	68	72																		
28	-17	-1	5	9	14	15	18	27	37	48	59	66	71	97																	
30	-19	-1	5	9	15	12	13	22	29	42	53	62	64	93	97																
32	-25	-6	3	10	15	14	14	25	34	47	56	63	66	90	95	98															
34	-27	-13	-4	5	11	8	10	21	29	42	52	56	60	85	91	95	97														
36	-28	-13	-3	7	12	11	12	23	31	43	51	55	58	79	87	90	94	98													
38	-27	-14	-3	7	12	9	8	19	25	36	41	44	46	66	75	83	87	92	95												
40	-25	-10	1	10	14	10	10	18	23	35	40	41	49	62	69	78	82	88	91	95											
42	-19	2	19	25	27	26	27	31	35	47	50	45	55	53	61	68	74	84	89	94	96										
44	-29	-17	-3	9	15	9	7	14	18	26	29	32	35	54	62	69	71	81	85	91	90	94									
46	-26	-15	-3	16	22	17	15	19	23	29	32	34	39	55	63	69	72	79	82	86	88	90	94								
48	-22	-14	-3	10	15	8	5	10	13	21	20	21	30	45	51	60	63	70	73	80	84	83	88	91							
50	-13	-16	-12	-1	4	0	0	3	3	11	9	9	19	34	38	42	46	56	60	68	73	69	79	76	89						
52	-12	-12	-9	2	8	2	2	4	5	12	10	8	17	24	30	36	40	52	56	63	71	70	71	66	83	93					
54	-15	-10	-4	12	18	11	7	7	7	5	2	-1	9	17	18	17	24	34	38	42	49	45	53	48	68	79	86				
56	0	-15	-9	5	8	4	3	3	-1	4	2	-3	10	6	9	10	12	21	24	27	33	34	38	30	54	69	74	86			
58	-18	-25	-22	-12	-9	-11	-14	-12	-10	-4	-5	-5	13	14	14	12	17	24	27	28	31	29	41	31	51	64	65	75	88		
60	-24	-35	-26	-15	-13	-17	-22	-22	-23	-15	-15	-15	-5	6	11	18	17	24	25	33	36	27	43	33	50	60	66	62	72	85	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A8. Meridional Winds From the Surface to 60 km at Churchill (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976

FORT CHURCHILL, MANITOBA

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	.035	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-1	-4	-6	-9	-11	-11	-7	-4	-3	-2	-2	-2	-2	-1	-2	-1	-1	-2	-1	-1	1	0	0	0	1	1	3	1	2	2	0
STDV	42	60	65	83	120	120	76	54	45	38	36	39	46	52	57	68	74	72	73	63	76	60	72	86	76	82	87	97	97	112	127
N	44	43	45	45	45	45	45	45	45	45	44	41	37	45	45	45	45	45	45	45	45	45	45	45	45	45	45	44	43	38	30
2	51	**																													
4	18	85																													
6	-11	55	87																												
8	-19	37	70	93																											
10	-18	29	52	86	95																										
12	-17	20	52	72	81	91																									
14	-14	16	43	61	69	79	94																								
16	-9	5	29	45	56	66	82	90																							
18	2	12	27	37	46	55	66	76	90																						
20	-1	18	29	35	41	46	57	62	80	90																					
22	-2	21	31	31	32	35	42	42	56	72	85																				
24	6	21	30	32	35	34	33	28	38	56	70	90																			
26	-3	25	27	24	22	22	23	18	27	45	62	80	82																		
28	-9	24	25	21	18	17	15	10	18	37	56	75	81	93																	
30	-1	33	30	23	16	15	10	4	7	25	43	61	65	86	92																
32	-2	34	29	23	19	16	10	3	8	27	47	66	64	88	87	89															
34	-5	22	16	12	10	8	6	1	4	16	40	55	56	79	80	86	83														
36	-12	31	28	26	21	19	17	13	13	26	42	53	47	75	72	78	79	87													
38	-4	32	24	22	18	16	10	9	9	22	40	46	38	66	66	79	79	80	84												
40	5	17	2	-1	2	2	-8	-8	-1	13	25	27	26	47	44	45	52	62	62	68											
42	-5	19	12	14	12	13	2	2	4	7	20	21	21	43	36	38	49	49	60	61	69										
44	-11	9	4	9	6	3	-7	-7	-7	-1	17	18	21	46	46	44	51	55	61	65	75	77									
46	-7	8	2	4	4	4	-8	-10	-8	-5	5	3	6	19	27	25	31	38	43	54	78	71	79								
48	2	19	10	14	20	22	10	11	13	18	25	14	12	33	31	27	37	42	41	51	75	75	74	76							
50	9	24	15	14	15	15	-1	-2	7	14	27	17	16	33	34	32	43	40	40	50	72	72	67	74	85						
52	-14	1	7	14	16	13	6	5	12	12	21	19	26	23	26	18	27	19	21	24	41	48	47	53	56	68					
54	-11	5	0	4	10	12	-3	-4	7	22	33	37	34	39	43	37	45	37	36	40	63	56	63	66	74	74	64				
56	-11	-21	-16	1	13	22	15	13	22	27	29	17	7	14	16	7	15	15	14	24	51	43	46	56	64	67	60	75			
58	-30	-17	-5	11	19	21	15	17	21	19	20	4	-9	14	10	8	13	20	24	25	62	41	54	52	55	68	55	54	71		
60	-28	-18	-13	-7	-3	-5	-11	-15	-5	0	3	-6	-21	16	17	13	15	16	12	15	57	28	42	31	54	53	40	51	58	76	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A8. Meridional Winds From the Surface to 60 km at Churchill (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976

FORT CHURCHILL, MANITOBA

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	.035	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-1	-3	-4	-5	-6	-7	-6	-4	-4	-3	-2	-1	-1	0	0	1	0	2	3	2	0	1	2	2	3	4	6	5	7	4	5
STDV	42	69	74	74	93	108	62	59	39	27	22	18	23	17	17	20	25	25	25	29	28	40	44	45	46	49	47	67	65	81	89
N	30	30	30	30	30	30	30	30	30	30	30	29	28	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	27	26
2	71	**																													
4	60	94																													
6	54	84	94																												
8	42	68	79	93																											
10	25	53	65	80	94																										
12	17	49	62	78	88	95																									
14	33	57	67	81	86	90	93																								
16	23	52	65	78	81	87	91	95																							
18	26	42	55	65	71	77	78	85	92																						
20	23	35	41	52	60	71	74	78	82	85																					
22	27	42	48	44	39	45	53	57	64	64	67																				
24	25	33	34	25	15	22	38	42	47	47	49	62																			
26	-1	30	43	40	33	33	42	34	47	43	25	58	45																		
28	21	13	13	11	3	-5	0	5	0	-7	12	18	20	2																	
30	-17	-11	-4	-6	-10	-10	-7	-8	-7	-1	-3	8	-5	-7	-1																
32	-6	6	4	1	-10	-9	-3	-9	-2	2	14	34	5	18	28	17															
34	-2	16	11	7	12	18	22	9	12	13	29	22	31	24	52	-21	40														
36	11	14	-1	0	-1	-7	-14	-12	-10	-11	-11	-4	-12	17	-20	-2	-10	-2													
38	-10	-32	-30	-18	-15	-12	-10	2	2	-3	5	-24	-9	-20	-2	24	-44	-41	24												
40	-13	-11	-6	-3	-4	-8	-5	-3	1	7	5	5	-11	-22	26	37	5	-7	-9	24											
42	-12	-3	5	12	15	15	22	14	20	27	31	35	11	-3	23	-2	55	29	-40	-49	23										
44	21	26	26	24	20	19	21	23	21	22	23	55	26	40	37	-23	42	42	12	-43	3	44									
46	23	29	30	20	15	8	5	8	2	7	2	15	11	37	28	3	0	30	28	-6	13	-18	52								
48	29	26	25	19	12	3	6	8	-3	-4	0	5	10	-7	38	-12	-7	17	-18	-9	41	19	32	54							
50	32	24	12	13	1	-10	-6	2	-11	-22	-19	-12	-4	-2	27	-19	-6	-7	11	5	28	-12	17	18	55						
52	-8	0	-8	-17	-30	-30	-18	-21	-25	-28	-25	-32	15	-11	7	-13	6	7	-23	-7	-2	-3	-26	-7	35	42					
54	2	18	15	11	6	5	11	7	10	6	12	20	17	17	19	-28	21	13	2	-8	27	25	41	29	41	33	37				
56	-9	25	27	25	26	21	23	16	15	8	6	10	6	22	38	-15	15	37	-1	-14	14	28	31	32	41	16	25	62			
58	-23	15	19	25	23	20	18	21	23	19	12	-7	-7	19	8	-9	2	8	32	6	4	7	23	40	5	8	-3	24	36		
60	-5	16	20	25	23	7	10	3	10	3	-7	9	-13	24	26	-9	14	8	67	10	30	17	49	47	41	26	-9	44	43	66	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A8. Meridional Winds From the Surface to 60 km at Churchill (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976

FORT CHURCHILL, MANITOBA

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	.035	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-1	-2	-3	-4	-4	-5	-4	-3	-3	-2	-2	-2	-1	-2	-1	-1	-1	0	0	0	0	0	0	1	3	4	2	2	3	4	1
STDV	52	72	81	111	154	178	130	98	68	58	50	51	49	59	65	72	83	85	94	84	97	112	122	120	127	136	149	136	136	133	155
N	51	52	52	52	52	52	52	52	52	51	50	46	43	52	52	52	51	52	52	51	48	51	52	51	52	52	50	52	52	46	40
2	59	**																													
4	38	81																													
6	17	69	95																												
8	6	59	90	97																											
10	-1	51	83	91	97																										
12	0	49	81	87	91	94																									
14	4	45	76	82	86	90	97																								
16	0	40	69	75	78	81	90	93																							
18	-7	32	54	58	61	63	75	81	91																						
20	-6	29	50	53	54	55	65	68	82	90																					
22	-12	5	21	24	27	29	38	41	56	69	85																				
24	-6	-2	0	0	1	2	10	11	26	44	63	69																			
26	-10	-7	2	4	5	5	5	6	16	30	53	78	82																		
28	-18	-10	-4	-4	-2	-1	-2	-1	6	14	39	61	66	89																	
30	-7	-6	-8	-9	-7	-8	-10	-9	-7	2	22	54	63	82	86																
32	-22	-29	-30	-29	-27	-26	-29	-27	-27	-19	2	30	46	70	80	84															
34	-9	-26	-31	-32	-32	-33	-36	-34	-31	-23	-2	33	49	66	80	83	83														
36	-11	-23	-28	-29	-27	-28	-33	-33	-34	-28	-13	20	38	58	72	83	85	84													
38	-4	-25	-30	-31	-30	-30	-36	-35	-36	-30	-10	18	35	51	62	75	76	77	64												
40	-6	-32	-34	-32	-31	-30	-38	-36	-39	-39	-25	4	20	37	52	64	70	75	82	87											
42	-9	-28	-43	-45	-45	-44	-48	-49	-46	-40	-27	-8	12	29	43	56	66	71	77	76	79										
44	-19	-35	-42	-40	-39	-36	-41	-42	-42	-35	-19	-3	13	30	42	53	65	68	75	81	82	88									
46	2	-19	-33	-37	-38	-39	-44	-43	-45	-39	-30	-15	6	20	41	48	53	64	65	77	81	85	90								
48	16	-10	-25	-30	-30	-32	-38	-40	-44	-49	-38	-29	-12	1	20	28	32	49	46	63	73	70	73	82							
50	-6	-36	-40	-37	-40	-41	-48	-46	-41	-37	-23	-2	8	17	33	36	44	51	51	66	70	74	76	71	64						
52	-27	-47	-48	-42	-41	-35	-43	-39	-39	-35	-30	-11	-3	9	24	24	40	44	49	59	69	62	70	62	45	75					
54	-26	-38	-40	-37	-33	-29	-35	-37	-41	-35	-30	-24	-15	6	20	21	29	34	35	47	50	55	65	63	49	62	74				
56	-28	-39	-48	-48	-43	-40	-43	-47	-47	-41	-29	-16	-8	13	29	34	33	38	39	47	42	57	65	59	44	53	59	73			
58	-5	-8	-25	-31	-30	-27	-30	-33	-38	-35	-27	-28	-28	5	31	32	37	37	43	49	51	64	72	64	59	57	57	68	72		
60	-21	-18	-29	-31	-27	-19	-24	-32	-34	-32	-14	-18	-14	3	30	19	35	29	38	41	47	59	67	58	46	54	53	61	58	75	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A9. Zonal Winds From 26 km to 60 km at Fort Sherman

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976
FORT SHERMAN, CANAL ZONE
EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-2	-1	-1	-4	-7	-7	-11	-14	-16	-23	-29	-33	-25	-10	-1	8	10	9
STDV	119	125	161	167	156	136	110	93	102	116	153	192	192	172	189	157	165	239
N	42	42	43	43	43	43	43	43	43	43	43	43	43	43	43	38	25	18
26	82	**																
30	58	82																
32	44	69	88															
34	30	47	44	55														
36	24	40	60	59	72													
38	17	16	26	31	34	62												
40	2	-4	3	1	13	39	80											
42	0	-20	-26	-27	-10	-1	45	72										
44	-4	-24	-25	-22	-34	-21	28	51	78									
46	-5	-18	-20	-14	-24	-20	15	37	64	85								
48	-19	-34	-37	-25	-21	-26	9	22	50	72	86							
50	-38	-49	-31	-20	-33	-19	-1	5	16	45	51	75						
52	-43	-49	-29	-21	-28	-19	-4	9	19	39	38	49	78					
54	-20	-31	-35	-27	-37	-25	-1	19	35	53	49	43	47	54				
56	-30	-23	1	15	-25	-8	2	-5	6	32	14	20	43	54	40			
58	-8	-18	8	16	-28	-5	4	-4	4	12	5	0	30	47	35	86		
60	-27	-43	-31	-62	-23	-10	-25	14	45	21	5	3	-5	8	12	-11	14	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A9. Zonal Winds From 26 km to 60 km at Fort Sherman (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976

FORT SHERMAN, CANAL ZONE

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-5	-8	-10	-13	-17	-17	-14	-8	-1	3	7	10	12	14	16	20	18	17
STDV	117	141	139	133	123	109	129	124	114	96	82	92	91	122	148	168	192	159
N	34	34	35	35	35	35	35	35	35	35	35	35	35	35	35	35	29	19
28	92	**																
30	85	92																
32	74	88	92															
34	53	71	83	89														
36	18	35	52	63	81													
38	-40	-26	-17	3	21	66												
40	-64	-51	-44	-26	-12	36	89											
42	-57	-49	-43	-29	-24	18	69	86										
44	-45	-34	-23	-8	-7	27	60	68	81									
46	-11	-4	4	16	4	25	42	39	47	73								
48	9	15	14	25	7	14	23	19	25	45	36							
50	10	14	21	22	9	13	14	14	21	35	64	82						
52	12	9	12	13	-2	4	4	5	12	15	47	61	02					
54	18	11	14	17	1	9	12	6	7	16	47	49	60	81				
56	3	-5	4	7	0	12	24	24	20	22	47	45	59	65	83			
58	-8	-13	-2	-7	-7	9	25	31	21	20	34	30	47	52	71	93		
60	0	-14	0	-1	-9	9	25	17	18	19	41	47	44	81	90	81	86	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A9. Zonal Winds From 26 km to 60 km at Fort Sherman (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976

FORT SHERMAN, CANAL ZONE

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-22	-25	-27	-27	-25	-25	-26	-26	-29	-30	-30	-28	-25	-18	-12	-6	0	-1
STDV	119	108	90	91	99	121	120	109	107	137	146	151	162	160	150	128	144	162
N	38	39	39	39	39	39	39	39	39	39	38	39	39	38	38	36	30	26
28	88	**																
30	49	72																
32	2	10	41															
34	-37	-26	-5	65														
36	-73	-70	-47	10	54													
38	-65	-77	-63	-7	34	80												
40	-53	-63	-55	-11	23	58	82											
42	-31	-49	-46	2	13	39	61	83										
44	-47	-57	-35	4	7	50	66	66	71									
46	-38	-34	-29	-31	-14	29	43	44	38	67								
48	-36	-31	-16	-12	1	26	34	48	31	52	74							
50	-26	-23	-17	-30	-15	11	20	29	11	35	52	80						
52	-30	-25	-13	-23	-18	-1	7	9	-9	12	30	54	80					
54	-22	-17	-14	-22	-24	-9	2	-4	-22	-5	16	34	62	90				
56	-1	10	8	-12	-29	-25	-25	-33	-39	-22	-2	9	34	59	82			
58	2	20	24	2	-16	-11	-41	-39	-44	-46	-11	-15	-18	34	62	74		
60	-9	16	14	-18	-6	-6	-32	-38	-53	-57	-12	-20	-10	29	52	62	82	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A9. Zonal Winds From 26 km to 60 km at Fort Sherman (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976

FORT SHERMAN, CANAL ZONE

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-20	-16	-10	-7	-4	-3	-1	2	4	7	8	11	12	10	15	19	17	15
STDV	149	153	146	142	146	140	136	128	113	114	105	121	109	151	164	142	153	166
N	36	36	36	36	35	36	36	36	36	36	35	36	36	36	34	30	28	22
28	76	**																
30	47	60																
32	9	48	60															
34	-5	27	55	64														
36	-15	-3	25	55	86													
38	-15	-5	-4	26	56	78												
40	-11	-12	-17	-5	24	53	76											
42	8	0	-20	-26	-18	-6	26	50										
44	6	8	-8	-3	-6	-8	19	14	75									
46	-3	-5	-10	-5	-15	-24	-21	-12	26	58								
48	-12	-25	-27	-30	-31	-24	-20	14	18	11	75							
50	-8	-10	-22	-6	-5	-11	11	18	39	51	61	62						
52	-19	5	-3	-1	-7	-16	-4	4	-5	8	37	31	36					
54	-4	8	-9	-11	-33	-44	-42	-35	-1	20	46	41	51	63				
56	31	41	32	29	19	-2	-9	-18	-1	36	36	10	25	33	52			
58	-2	17	32	43	39	25	4	9	0	5	22	32	24	18	46	63		
60	-8	25	57	61	37	7	-13	-18	-12	10	21	20	16	27	26	54	86	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A10. Meridional Winds From 26 km to 60 km at Fort Sherman

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976

FORT SHERMAN, CANAL ZONE

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	0	1	0	-1	0	2	2	3	4	3	2	7	8	9	8	2	-1	-1
STDV	33	36	41	51	43	53	63	52	63	101	99	102	155	199	144	101	138	196
N	42	42	43	43	43	43	43	43	43	43	43	43	43	43	43	38	28	18
26	62	**																
30	20	16																
32	1	-16	46															
34	-6	-6	40	39														
36	10	23	10	31	40													
38	43	22	18	7	-9	30												
40	-3	-7	28	36	8	-16	21											
42	-6	-1	3	-4	19	12	-20	5										
44	9	10	-12	-3	8	17	-41	-12	62									
46	25	28	21	2	19	40	8	-13	31	40								
48	3	-6	18	9	12	9	-21	2	-8	0	52							
50	-26	-31	6	12	-9	-11	-32	11	-8	16	-10	45						
52	7	-17	6	10	-24	-24	8	11	3	-9	-14	32	65					
54	-1	-11	15	46	-4	-9	14	41	-21	-28	-23	23	44	71				
56	1	13	5	-6	-3	-3	19	-7	4	-8	-20	-19	5	21	35			
58	-11	-5	6	37	-9	16	30	18	-28	-22	-47	-56	8	8	46	70		
U	0	-48	19	73	-6	7	37	39	-16	-34	-60	-24	16	33	54	38	80	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A10. Meridional Winds From 26 km to 60 km at Fort Sherman (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976

FORT SHERMAN, CANAL ZONE

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	1	2	2	2	2	3	3	2	1	-1	-1	0	2	3	3	2	1	-1
STDV	34	37	40	36	45	42	53	61	58	55	54	59	73	89	83	105	99	100
N	34	34	35	35	34	35	35	35	35	35	35	35	35	35	35	35	29	19
28	10 **																	
30	-10	39																
32	-6	19	47															
34	-19	12	6	16														
36	-26	11	19	29	51													
38	-1	-14	19	21	-10	9												
40	9	-20	-1	33	-19	-31	57											
42	-1	-11	1	4	-29	-31	32	73										
44	-23	-6	-11	-36	19	14	17	5	41									
46	-5	16	-21	-39	-2	1	-24	-16	16	59								
48	12	-11	-32	-29	-5	-10	-23	-5	-15	8	51							
50	24	-19	-1	-6	-21	-15	-6	10	-3	-22	16	67						
52	35	-6	14	20	-28	-25	-4	27	12	-44	-13	28	73					
54	16	-53	-4	-14	-33	-24	14	26	31	4	0	13	43	47				
56	17	-42	-22	-18	-16	-21	0	26	42	23	25	25	34	28	82			
58	8	-16	-28	-9	-2	-20	-15	17	26	21	23	40	21	19	50	74		
60	0	22	-5	33	-47	-15	-4	3	-1	-36	-2	-11	7	27	9	-9	48	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A10. Meridional Winds From 26 km to 60 km at Fort Sherman (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976

FORT SHERMAN, CANAL ZONE

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	2	4	3	1	1	0	1	2	2	3	2	5	6	6	10	9	12	11
STDV	29	40	43	64	56	43	60	54	56	54	84	71	77	113	134	121	158	218
N	38	39	39	39	39	39	39	39	39	39	39	39	39	38	38	36	30	26
26	21	**																
30	11	40																
32	10	11	15															
34	20	5	10	61														
36	21	-1	1	11	37													
38	26	1	15	30	14	63												
40	17	-8	19	28	21	33	63											
42	9	12	5	28	36	8	3	33										
44	6	13	-3	43	32	16	17	29	52									
46	14	-1	-42	5	2	21	26	2	-5	22								
48	10	22	1	15	13	5	17	7	3	21	68							
50	3	16	-21	-36	0	3	-23	-20	5	6	43	42						
52	-7	-31	-36	-47	-7	11	-10	1	-12	-9	-11	-25	40					
54	29	0	-16	-11	-1	12	11	12	-9	-1	-32	-30	-10	62				
56	8	30	10	6	4	-1	-12	-8	-17	3	-42	-12	-16	22	68			
58	1	31	0	2	4	-27	-27	-19	3	-1	25	63	31	-9	2	42		
60	-19	38	-3	-9	14	-20	-30	-19	14	7	43	66	45	-36	-53	-10	75	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A10. Meridional Winds From 26 km to 60 km at Fort Sherman (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976
FORT SHERMAN, CANAL ZONE
NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	2	2	3	-1	-1	0	0	0	2	1	1	1	1	3	1	3	2	3
STDV	29	26	28	51	43	45	49	49	54	44	68	71	84	101	69	124	117	109
N	36	36	35	36	36	36	36	36	36	36	36	36	35	35	34	31	28	22
28	40 **																	
30	11	43																
32	-3	24	45															
34	-13	5	36	57														
36	11	8	-2	-15	-5													
38	-17	-26	-10	3	-1	64												
40	-3	4	1	-2	-8	8	41											
42	14	12	3	18	-11	3	2	54										
44	-26	-30	-25	-19	-15	26	35	27	38									
46	-10	3	5	-24	-22	50	16	-11	9	54								
48	15	11	18	-24	-9	27	-5	-18	-21	19	64							
50	-10	-7	8	-10	15	34	15	-12	-23	6	38	43						
52	14	-2	22	-26	-19	26	6	17	19	16	17	16	2					
54	7	9	24	4	-13	11	4	2	0	9	18	13	3	47				
56	-11	-11	10	9	26	3	-2	5	-3	12	4	-22	-1	5	52			
58	0	-29	-31	-18	8	30	20	8	-1	21	29	3	29	1	-1	52		
60	4	2	20	11	22	29	6	-10	-49	-37	3	2	18	13	0	28	76	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A11. Zonal Winds From 26 km to 60 km at Barking Sands

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976

BARKING SANDS, HI

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	0	2	7	9	9	6	5	3	2	1	2	3	6	12	21	31	43	52
STDV	75	102	120	138	151	155	160	160	156	164	211	246	250	251	280	285	289	262
N	48	48	48	48	48	48	48	48	48	48	48	48	48	48	47	46	35	23
28	92	**																
30	78	91																
32	72	80	91															
34	57	68	77	92														
36	47	58	65	79	94													
38	30	40	46	64	81	91												
40	5	17	24	41	60	73	92											
42	-11	1	3	18	39	55	76	89										
44	-21	-14	-20	-5	11	25	44	59	83									
46	-30	-23	-28	-16	-6	3	19	39	62	86								
48	-38	-31	-35	-26	-18	-7	7	30	50	74	92							
50	-30	-26	-31	-26	-18	-8	6	25	43	63	79	91						
52	-27	-25	-29	-27	-18	-6	7	24	40	55	64	74	91					
54	-25	-25	-29	-25	-16	-3	9	24	40	55	63	71	87	96				
56	-19	-18	-21	-19	-11	3	10	22	36	51	55	62	79	87	95			
58	-12	-9	-18	-10	1	11	14	23	38	55	55	64	80	85	90	95		
60	-24	-24	-25	-18	-17	-12	2	20	41	51	56	70	80	84	90	92	96	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A11. Zonal Winds From 26 km to 60 km at Barking Sands (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976

BARKING SANDS, HI

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	<26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-4	-2	-2	-3	-4	-4	-4	-3	-3	-2	1	5	7	7	7	7	9	9
STDV	47	71	88	101	102	97	93	99	112	124	130	142	148	153	161	173	187	193
N	52	53	54	54	54	54	54	54	54	54	54	54	54	54	54	49	38	26
28	84	**																
30	77	92																
32	65	82	89															
34	54	70	76	94														
36	44	58	64	80	89													
38	23	37	45	62	73	85												
40	17	24	31	51	63	67	84											
42	16	11	23	41	52	58	71	89										
44	24	16	29	39	47	48	57	77	91									
46	14	9	24	31	38	42	52	73	83									
48	21	15	23	31	37	39	50	68	78	87								
50	22	16	24	31	38	40	49	69	78	80	87	94						
52	22	13	20	26	35	36	45	63	70	79	82	86	91					
54	24	8	20	24	28	27	33	52	71	77	77	80	82	89				
56	46	39	46	50	49	40	38	51	66	77	78	82	78	81	83			
58	45	43	52	47	41	26	22	34	56	64	67	67	67	73	72	89		
60	44	45	52	42	39	19	-1	19	44	57	58	66	61	59	62	69	83	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A11. Zonal Winds From 26 km to 60 km at Barking Sands (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976

BARKING SANDS, HI

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-24	-25	-27	-28	-29	-32	-37	-40	-44	-47	-48	-49	-50	-49	-42	-35	-30	-23
STDV	31	35	31	40	43	55	53	62	74	74	71	77	85	105	127	140	171	186
N	47	51	55	55	55	55	55	55	55	55	55	55	55	55	55	51	41	26
28	50 **																	
30	25	54																
32	21	22	52															
34	22	23	34	59														
36	32	14	14	25	61													
38	26	16	25	30	29	68												
40	2	4	6	25	15	22	62											
42	0	2	-7	2	-2	-10	3	50										
44	-18	-18	-22	-13	6	-6	-5	33	75									
46	-3	1	-24	-9	7	10	4	23	60	80								
48	-18	2	-22	3	4	-8	-2	35	51	55	73							
50	-12	4	-10	4	7	12	18	27	30	34	56	77						
52	-12	-1	-6	3	2	12	24	42	28	36	41	57	74					
54	-22	-12	-11	-10	-14	1	5	18	12	20	27	44	55	71				
56	-31	-26	-32	-18	-20	-14	-1	19	24	24	25	45	40	46	81			
58	-35	-11	-33	-12	-6	-12	-2	27	31	27	12	6	-14	-19	2	43		
60	-15	3	-17	-26	-23	-4	17	19	25	24	23	-1	-15	-41	-2	23	75	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A11. Zonal Winds From 26 km to 60 km at Barking Sands (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976

BARKING SANDS, HI

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-11	-11	-9	-6	-1	6	10	15	18	22	26	30	34	37	36	37	36	38
STDV	46	58	60	74	94	115	120	116	130	138	149	151	166	162	166	179	192	187
N	39	41	44	44	44	44	44	44	44	44	44	44	44	44	44	42	34	20
26	89	**																
28	75	83																
30	63	69	81															
32	57	58	62	86														
34	42	47	51	72	92													
36	45	55	61	76	85	90												
38	48	56	64	74	77	84	93											
40	46	51	60	72	74	78	86	91										
42	41	45	51	62	61	66	74	80	89									
44	42	43	53	59	55	58	67	73	84	96								
46	46	43	55	60	50	50	63	70	83	91	95							
48	45	44	58	63	50	49	64	70	82	86	90	96						
50	50	50	62	69	58	60	73	79	87	86	87	91	95					
52	46	48	61	62	55	54	71	75	82	84	81	88	92	95				
54	56	59	63	67	61	60	73	77	81	76	78	84	87	91	94			
56	58	63	74	76	64	53	71	71	77	74	75	82	85	86	90	95		
58	58	80	73	73	58	42	67	64	72	73	73	75	78	74	81	85	95	
60																		

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A12. Meridional Winds From 26 km to 60 km at Barking Sands

CORRELATION AT PAIRS OF LEVELS FOR JAN 1964-1976
BARKING SANDS, HI
NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	2	1	1	0	-1	-2	-1	0	2	3	4	9	7	2	4	7	9	10
STDV	26	40	52	61	71	65	77	86	98	119	136	169	171	150	143	163	176	194
N	46	46	46	48	48	48	48	48	48	48	46	48	48	48	47	46	35	23
28	61	**																
30	38	66																
32	19	29	64															
34	20	30	36	73														
36	18	20	30	54	69													
38	27	23	16	21	33	68												
40	34	14	2	10	26	47	75											
42	31	18	19	32	40	58	53	69										
44	22	12	8	18	28	44	40	40	78									
46	25	6	3	15	25	40	34	45	72	82								
48	30	10	12	26	26	42	29	37	70	75	85							
50	30	10	16	27	18	29	16	18	53	61	64	86						
52	30	10	9	20	21	26	6	9	39	44	45	65	82					
54	38	11	21	26	25	28	7	15	30	28	33	49	50	74				
56	45	17	21	14	16	23	7	21	27	23	28	46	41	57	85			
58	51	6	13	15	13	5	-7	19	16	24	32	49	51	70	89	86		
60	38	-16	-2	-12	-29	-18	-29	0	-4	-7	0	33	51	75	77	69	81	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A12. Meridional Winds From 26 km to 60 km at Barking Sands (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976

BARKING SANDS, HI

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	1	1	1	0	0	1	1	0	2	4	5	7	6	5	7	9	8	6
STDV	29	26	31	31	40	44	43	46	51	56	50	66	63	75	77	85	77	80
N	52	53	54	54	54	54	34	54	54	54	54	54	54	54	54	49	39	26
28	14	**																
30	38	47																
32	21	8	33															
34	2	9	16	38														
36	-16	1	-9	-14	44													
38	-23	17	10	-2	24	58												
40	-15	-21	4	22	24	16	31											
42	-13	-19	-19	14	-9	-10	2	46										
44	-13	-6	-12	-2	-1	-4	20	24	63									
46	-20	24	17	11	23	6	34	21	17	49								
48	-18	13	0	16	24	6	18	24	-3	11	48							
50	7	2	-16	1	8	-10	3	8	-4	-4	10	50						
52	14	9	-10	8	-19	0	-7	-12	6	13	10	4	32					
54	-6	4	5	-2	-17	10	12	11	19	29	25	-14	-6	49				
56	3	-6	-8	-2	-14	5	1	43	41	29	4	-8	-3	19	48			
58	-10	1	1	13	22	24	8	22	-3	16	6	45	11	8	-9	35		
60	6	17	22	7	23	10	1	-6	-1	-2	-6	1	-9	-9	-40	-5	42	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A12. Meridional Winds From 26 km to 60 km at Barking Sands (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976

BARKING SANDS, HI

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	1	0	3	2	2	1	1	0	0	3	5	5	6	7	6	5	8	8
STDV	23	22	26	29	27	29	41	45	48	51	57	61	67	76	96	106	116	145
N	47	51	55	55	55	55	55	55	55	55	55	55	55	55	55	51	41	26
26	-14 **																	
30	-22	17																
32	4	-17	15															
34	16	20	-39	-10														
36	-5	19	-1	-36	-3													
38	20	20	-8	-21	-16	20												
40	32	3	-13	14	-7	-13	23											
42	18	3	-16	28	3	-3	-33	37										
44	3	17	3	10	14	-5	-42	-23	36									
46	9	9	9	5	-5	-21	-3	-27	-19	37								
48	21	4	-7	20	-11	-17	-6	2	9	21	54							
50	16	12	-4	19	3	1	-7	-10	4	9	25	44						
52	23	-21	-14	23	-10	-9	-15	17	22	-11	-4	3	40					
54	7	-17	-8	19	-15	-5	-13	8	4	-22	-3	8	30	64				
56	-6	-24	7	29	-6	-16	-13	9	24	-16	5	10	15	36	42			
58	-8	-13	22	18	-11	-7	-7	11	39	14	14	5	-16	-1	9	58		
60	-1	-5	21	9	-10	-13	11	-28	-6	13	49	13	-19	-11	1	13	53	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A12. Meridional Winds From 26 km to 60 km at Barking Sands (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976
BARKING SANDS, HI
NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	1	1	0	1	1	1	1	1	1	4	5	6	4	4	5	7	9	9
STDV	26	29	30	41	39	45	50	52	57	55	54	53	72	72	62	69	77	65
N	39	41	44	44	44	44	44	44	44	44	44	44	44	44	44	42	34	20
28	15	**																
30	-6	4																
32	6	-1	-4															
34	4	-38	-31	38														
36	15	36	6	2	19													
38	15	30	28	13	7	37												
40	10	9	-5	11	17	-10	28											
42	38	25	-12	11	26	9	19	54										
44	31	22	-1	17	17	21	5	15	58									
46	23	19	-11	14	22	34	-6	-5	30	59								
48	13	11	2	25	32	25	17	20	46	20	48							
50	-5	9	10	39	29	19	5	27	35	15	41	68						
52	19	4	-1	44	22	3	-5	13	24	22	48	48	68					
54	26	5	-21	42	28	-2	-5	29	34	38	49	35	51	78				
56	-7	-4	-14	10	3	-20	-22	13	13	8	-9	5	21	14	29			
58	12	8	8	-2	15	12	-21	-2	5	14	22	19	12	14	5	43		
60	9	-25	11	-15	15	13	15	51	36	24	20	28	30	23	37	36	33	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A13. Zonal Winds From 26 km to 60 km at Cape Kennedy

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976

CAPE KENNEDY, FL

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	5	7	10	15	19	17	15	15	13	12	13	13	14	16	19	26	33	41
STDV	96	111	126	143	146	158	176	194	213	233	233	255	248	242	255	256	250	254
N	49	54	55	55	55	55	55	55	55	55	55	55	55	55	54	47	43	26
28	94	**																
30	84	93																
32	65	78	91															
34	54	66	79	90														
36	32	43	57	70	89													
38	19	28	42	56	75	91												
40	-3	6	20	34	54	76	92											
42	-6	3	13	26	44	67	84	96										
44	-17	-9	1	13	31	57	72	86	94									
46	-22	-15	-7	3	19	48	60	75	85	95								
48	-28	-18	-11	0	15	42	53	69	80	91	97							
50	-28	-20	-12	-3	13	41	52	67	79	90	95	98						
52	-26	-19	-12	-1	17	37	49	64	76	86	92	93	97					
54	-31	-22	-13	3	13	38	51	65	75	85	89	94	96					
56	-26	-19	-11	2	11	32	46	59	70	81	86	85	92	91	97			
58	-30	-20	-14	0	9	32	43	55	67	78	77	79	83	81	89	95		
60	-25	-21	-25	-13	-3	19	33	41	57	76	75	78	84	82	84	90	96	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A13. Zonal Winds From 26 km to 60 km at Cape Kennedy (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976

CAPE KENNEDY, FL

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-1	2	4	5	7	6	4	3	4	2	1	0	2	2	1	1	2	3
STDV	55	74	86	105	125	133	115	105	105	119	131	147	139	154	147	133	136	152
N	48	48	50	50	50	50	50	50	50	50	50	50	50	50	50	48	39	32
28	85	**																
30	71	91																
32	55	78	90															
34	49	70	80	92														
36	49	66	68	78	92													
38	47	64	64	75	85	93												
40	44	58	63	77	84	86	92											
42	43	55	56	69	76	81	91	90										
44	36	54	52	60	63	68	73	75	85									
46	29	41	43	51	45	45	58	63	66	85								
48	14	24	33	41	29	26	36	48	61	65	90							
50	8	14	21	34	32	31	35	44	52	64	73	83						
52	11	18	20	30	29	31	35	41	48	60	72	76	93					
54	10	12	15	22	18	18	22	30	43	54	65	71	82	88				
56	5	4	5	11	2	3	11	21	31	41	56	64	72	74	87			
58	-8	4	3	6	0	4	11	15	27	47	56	54	62	70	80	91		
60	-2	11	19	25	14	11	12	17	37	57	59	60	68	68	81	79	84	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A13. Zonal Winds From 26 km to 60 km at Cape Kennedy (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976

CAPE KENNEDY, FL

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-13	-22	-24	-25	-26	-29	-33	-35	-39	-46	-48	-50	-51	-54	-55	-53	-50	-46
STDV	33	34	41	52	46	50	55	47	63	67	81	80	86	90	110	128	154	168
N	54	56	56	56	56	56	56	56	56	56	56	56	56	56	56	53	45	35
28	56	**																
30	55	67																
32	40	28	70															
34	14	16	48	69														
36	30	37	57	58	62													
38	38	32	54	29	27	52												
40	30	22	38	28	15	29	66											
42	6	18	28	20	9	27	22	61										
44	-11	9	20	17	24	26	6	28	74									
46	13	16	41	34	27	20	11	12	25	48								
48	15	19	32	20	17	8	11	1	-2	20	68							
50	3	16	17	12	15	7	15	2	-13	4	40	84						
52	-10	18	11	13	15	10	14	1	-4	0	22	38	82					
54	-20	-3	-7	-2	-1	-4	11	-6	2	16	22	37	49	67				
56	-24	0	-3	3	22	23	28	11	23	14	0	6	17	34	64			
58	-11	10	-8	-14	-7	18	21	5	9	14	-15	-18	-15	4	32	71		
60	-24	-11	-13	-32	-28	1	6	15	1	-10	-7	-29	-29	-12	8	2	42	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A13. Zonal Winds From 26 km to 60 km at Cape Kennedy (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976
CAPE KENNEDY, FL
EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-6	-4	-3	0	4	8	11	15	16	21	25	29	32	35	37	39	35	32
STDV	49	63	67	75	86	116	127	139	155	171	187	210	216	222	213	228	210	189
N	52	54	54	54	54	54	54	54	54	54	54	54	54	54	54	49	41	27
28	83 **																	
30	72	88																
32	62	76	85															
34	55	68	79	90														
36	40	58	66	75	87													
38	50	61	66	78	87	91												
40	52	52	50	63	67	75	89											
42	51	45	46	55	58	70	81	92										
44	54	41	42	48	48	58	72	85	93									
46	56	43	45	51	50	56	71	87	88	97								
48	55	44	48	53	51	58	74	82	90	95	97							
50	51	41	43	50	46	58	72	80	89	93	94	97						
52	51	42	44	52	48	59	72	78	89	92	93	95	98					
54	48	38	39	48	46	54	67	76	86	89	91	93	95	96				
56	45	39	40	47	45	54	67	78	87	88	89	91	90	93	95			
58	45	41	43	40	40	52	65	77	88	87	88	89	89	91	93	96		
60	53	52	47	51	45	44	58	74	81	82	86	84	83	81	87	92	95	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A14. Meridional Winds From 26 km to 60 km at Cape Kennedy

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976

CAPE KENNEDY, FL

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	1	2	3	4	2	0	1	1	4	9	10	10	9	9	11	9	11	14
STDV	32	51	64	62	74	82	74	75	88	102	122	120	135	159	144	156	140	122
N	49	54	55	55	55	55	55	55	55	55	55	55	55	55	54	47	42	26
28	60	**																
30	57	69																
32	28	58	70															
34	25	47	57	64														
36	40	41	54	63	66													
38	39	50	44	49	50	71												
40	25	32	17	29	40	49	64											
42	27	19	28	23	31	40	38	42										
44	14	16	22	23	19	36	33	34	75									
46	19	15	11	11	15	27	21	30	46	71								
48	12	9	6	2	12	19	14	37	43	43	66							
50	12	4	13	15	17	19	12	28	43	42	61	83						
52	4	2	5	18	12	26	22	38	45	41	54	64	83					
54	10	11	23	32	24	35	23	33	46	42	55	60	73	86				
56	15	8	22	20	29	38	21	28	48	36	52	60	65	75	87			
58	-5	-13	-10	-9	-7	3	-4	4	31	21	37	50	49	51	58	77		
60	9	-33	-6	-42	-23	-19	-34	-17	-1	6	35	35	28	22	29	42	59	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A14. Meridional Winds From 26 km to 60 km at Cape Kennedy (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976
CAPE KENNEDY, FL
NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	1	2	2	1	0	-2	-2	0	0	0	1	3	4	4	3	4	6	5
STDV	24	35	35	49	53	52	63	65	70	70	75	75	69	71	69	75	81	97
N	48	48	50	50	50	50	50	50	50	50	50	50	50	50	50	48	39	32
28	49	**																
30	19	62																
32	37	37	56															
34	17	24	30	49														
36	7	25	35	44	59													
38	-3	6	41	45	25	55												
40	-2	0	32	37	43	34	62											
42	28	-3	15	15	23	9	15	45										
44	26	20	35	25	32	32	21	33	61									
46	-19	-9	11	15	2	19	33	33	15	49								
48	6	2	11	35	39	34	45	48	7	18	61							
50	30	17	26	19	18	29	22	31	18	22	26	53						
52	33	10	17	3	-2	9	13	16	51	32	21	32	56					
54	11	26	30	9	4	14	7	-10	22	30	17	7	1	45				
56	23	31	20	24	10	23	9	5	6	30	36	27	16	20	49			
58	26	15	5	29	34	18	44	47	42	34	26	43	35	21	-1	34		
60	25	35	27	19	35	27	36	25	33	35	13	6	-1	-17	16	21	55	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A14. Meridional Winds From 26 km to 60 km at Cape Kennedy (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976
CAPE KENNEDY, FL
NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-1	-1	1	2	1	0	1	0	-2	0	3	5	5	6	7	7	5	4
STDV	25	27	30	34	35	38	49	55	57	76	82	98	75	85	105	112	119	136
N	54	56	56	56	56	56	56	56	56	56	56	56	56	56	56	53	45	35
28	20	**																
30	-29	44																
32	-10	-8	9															
34	39	-20	-36	16														
36	21	4	-11	-58	15													
38	-3	8	-1	-53	-37	45												
40	2	15	10	11	-31	-32	39											
42	8	9	5	45	-5	-46	-40	20										
44	6	11	10	28	25	-12	-52	-42	49									
46	5	22	3	19	13	3	-41	-32	23	72								
48	14	-11	5	27	1	-12	-14	4	19	23	32							
50	5	-4	-8	6	6	3	15	17	6	-13	-2	33						
52	-3	-30	-17	-6	3	16	19	10	-15	-36	-28	1	66					
54	6	-43	-21	-6	14	18	6	-4	-19	-25	-27	-3	5	58				
56	10	-32	-15	-1	15	10	6	9	-13	-29	-44	-23	-4	31	71			
58	0	-36	-26	3	18	19	5	-6	-11	-10	-15	-8	-7	2	38	67		
60	-20	-13	-17	-8	-15	-2	-6	3	27	19	27	2	32	20	3	-9	24	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A14. Meridional Winds From 26 km to 60 km at Cape Kennedy (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976
CAPE KENNEDY, FL
NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	1	0	1	3	2	-1	-1	-1	1	4	4	5	5	5	8	5	2	5
STDV	25	25	33	35	41	50	54	58	54	52	72	81	80	74	74	75	83	92
N	52	54	54	54	54	54	54	54	54	54	54	54	54	54	54	49	41	27
28	30	**																
30	36	24																
32	45	4	50															
34	16	-4	10	37														
36	3	14	28	0	45													
38	1	9	30	8	7	40												
40	19	13	28	31	15	9	26											
42	22	26	16	2	4	18	10	42										
44	39	13	31	17	21	11	22	17	59									
46	12	10	8	1	16	14	13	23	50	59								
48	8	9	11	8	12	13	1	32	35	32	75							
50	6	8	24	10	27	19	-8	27	39	34	63	83						
52	22	9	21	13	26	20	5	1	23	41	49	55	73					
54	13	-7	10	24	13	-4	-3	-8	1	32	37	42	51	74				
56	2	11	12	12	18	13	1	24	28	32	53	54	62	48	56			
58	22	22	39	6	-6	13	16	24	27	33	24	38	47	39	30	64		
60	14	13	54	10	5	22	22	16	19	29	15	26	32	25	31	46	76	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A15. Zonal Winds From 26 km to 60 km at White Sands

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976

WHITE SANDS MISSILE RANGE, NM

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	3	5	8	10	14	17	17	21	23	28	33	39	41	42	44	45	52	58
STDV	115	149	168	199	227	246	248	245	257	267	283	304	307	289	296	267	272	273
N	60	61	62	62	62	63	63	63	63	63	62	63	63	63	63	58	58	52
28	89	**																
30	84	90																
32	76	86	94															
34	67	75	85	91														
36	60	69	77	89	94													
38	49	60	63	78	84	94												
40	32	42	48	63	73	82	89											
42	11	21	22	36	50	63	77	90										
44	-7	-4	-5	9	22	36	57	70	89									
46	-21	-14	-23	-10	4	17	40	56	80	94								
48	-31	-29	-36	-25	-12	1	26	41	66	84	93							
50	-37	-33	-41	-31	-19	-8	16	33	59	76	89	96						
52	-33	-31	-39	-34	-21	-9	15	30	56	72	85	90	96					
54	-30	-28	-42	-34	-21	-7	15	29	55	70	83	85	90	94				
56	-29	-27	-35	-32	-19	-7	12	31	54	66	77	81	87	93	94			
58	-21	-16	-19	-18	-4	6	25	40	57	65	74	76	79	86	85	94		
60	-19	-16	-13	-7	8	15	31	44	60	65	74	75	76	80	61	66	95	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A15. Zonal Winds From 26 km to 60 km at White Sands (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976
WHITE SANDS MISSILE RANGE, NM
EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	0	4	8	11	14	15	17	15	13	12	11	10	10	9	6	3	2	1
STDV	54	57	69	76	96	106	126	154	154	151	165	185	181	201	177	199	210	201
N	49	58	60	60	60	60	60	60	60	60	60	60	60	60	60	56	51	46
28	85	**																
30	67	84																
32	55	66	82															
34	23	47	63	83														
36	8	23	45	66	85													
38	-3	10	34	61	74	90												
40	-8	14	30	53	70	77	87											
42	-16	3	24	45	60	72	82	93										
44	-11	6	19	39	59	69	76	84	90									
46	-13	6	16	30	52	59	68	76	79	89								
48	-5	7	15	35	54	60	70	78	79	86	92							
50	-4	6	10	29	49	57	63	73	77	86	89	91						
52	-5	5	7	25	45	52	58	71	72	80	86	86	94					
54	5	8	4	23	33	46	54	64	64	74	75	80	85	87				
56	1	7	16	27	41	50	54	60	63	73	76	78	83	86	85			
58	3	2	7	25	29	33	49	56	61	73	78	79	81	75	77	81		
60	5	0	-3	10	21	33	39	47	57	65	63	65	71	62	72	66	77	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A15. Zonal Winds From 26 km to 60 km at White Sands (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976

WHITE SANDS MISSILE RANGE, NM

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-18	-20	-21	-23	-24	-27	-30	-34	-39	-42	-45	-47	-50	-54	-59	-59	-60	-62
STDV	41	44	40	41	48	61	67	58	68	70	83	93	101	116	106	121	151	172
N	50	55	58	58	58	58	58	58	56	58	58	58	58	58	58	54	51	48
28	49	**																
30	28	46																
32	13	18	51															
34	9	16	11	35														
36	12	23	12	7	44													
38	54	38	19	-6	-8	36												
40	59	47	20	4	-1	13	57											
42	32	38	6	19	31	7	6	55										
44	26	22	19	29	18	26	-5	20	47									
46	35	10	-4	7	20	9	16	8	27	43								
48	11	22	14	9	24	29	20	1	13	20	65							
50	-9	0	17	8	4	23	-7	-15	-7	31	30	62						
52	-36	-11	24	8	0	16	-19	-34	-26	4	5	50	78					
54	10	-8	-7	3	6	-9	28	14	13	-25	25	37	8	24				
56	24	10	-5	-2	2	8	34	42	37	8	23	14	-4	-5	53			
58	-2	30	29	11	0	13	12	18	13	11	-5	25	17	25	30	53		
60	-14	-1	8	4	-3	-8	-6	-8	1	1	5	28	4	10	23	27	64	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A15. Zonal Winds From 26 km to 60 km at White Sands (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976
WHITE SANDS MISSILE RANGE, NM
EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	1	4	6	10	15	19	23	24	26	28	31	35	40	43	48	51	53	55
STDV	66	75	106	113	136	169	184	198	205	210	206	230	266	283	295	222	202	232
N	51	56	57	58	58	58	58	58	58	58	58	58	58	58	57	55	51	51
28	89	**																
30	76	86																
32	66	76	94															
34	63	74	84	88														
36	63	71	80	85	95													
38	60	65	72	80	89	95												
40	57	60	62	70	81	87	95											
42	58	64	59	66	79	86	92	97										
44	60	66	59	66	77	84	90	94	98									
46	63	69	62	70	78	83	87	90	95	97								
48	61	69	65	73	81	86	90	90	93	94	97							
50	54	65	64	73	81	83	87	87	90	91	93	97						
52	50	58	61	71	78	82	86	86	88	69	91	94	97					
54	42	52	57	68	77	80	84	84	86	88	89	92	95	98				
56	66	78	65	66	77	83	84	85	89	88	90	92	93	93	94			
58	70	79	64	65	77	81	83	86	86	88	89	91	90	91	95	93		
60	63	71	63	68	77	81	82	83	82	82	84	87	82	85	88	87	92	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A16. Meridional Winds From 26 km to 60 km at White Sands

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976
WHITE SANDS MISSILE RANGE, NM
NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-1	0	0	2	2	0	0	2	4	7	7	10	12	11	13	12	10	14
STDV	52	58	69	76	87	97	107	128	132	136	159	206	204	202	197	218	240	190
N	60	61	62	62	62	63	63	63	63	63	62	63	63	63	63	58	58	52
28	69	**																
30	58	73																
32	35	59	70															
34	18	45	57	76														
36	11	28	48	65	75													
38	11	31	44	55	62	79												
40	-5	23	34	55	66	70	80											
42	-21	19	23	43	51	52	66	80										
44	-18	13	18	32	43	38	58	65	85									
46	-14	12	12	23	37	34	47	64	79	84								
48	-29	2	-4	-1	16	13	30	47	68	71	78							
50	-34	-11	-17	-11	11	11	14	31	54	67	72	85						
52	-31	-16	-14	-10	10	16	22	35	53	64	66	72	87					
54	-23	-17	-11	-1	20	29	32	50	69	69	64	66	71	85				
56	-26	-22	-1	-2	23	37	38	58	79	83	79	67	65	77	83			
58	-26	-23	-9	-4	21	38	30	43	49	46	53	58	60	71	76	88		
60	-16	-38	-15	-14	11	24	28	30	36	31	40	36	47	59	61	72	75	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A16. Meridional Winds From 26 km to 60 km at White Sands (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976
WHITE SANDS MISSILE RANGE, NM
NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	1	1	1	1	1	1	0	-2	1	1	3	5	4	5	4	6	7	5
STDV	31	32	41	50	65	60	75	87	88	93	85	66	88	69	67	124	108	137
N	49	58	60	60	60	60	60	60	60	60	60	60	60	60	60	56	51	46
28	52	**																
30	27	40																
32	27	36	70															
34	17	27	35	67														
36	36	36	53	71	69													
38	6	1	33	46	43	58												
40	-9	10	32	42	48	42	71											
42	0	5	21	37	36	32	33	60										
44	-11	-8	21	28	27	22	35	48	76									
46	3	-11	24	35	24	34	57	43	38	61								
48	-12	-5	9	23	7	15	25	37	28	46	44							
50	-35	-12	30	27	0	11	26	36	16	29	23	44						
52	-10	-4	30	33	30	34	27	44	36	42	37	27	37					
54	-7	4	13	24	14	17	7	20	35	36	32	24	24	39				
56	-19	-19	6	16	6	10	26	26	42	55	41	45	29	34	43			
58	-11	-4	3	21	1	17	21	22	42	44	49	59	50	40	34	65		
60	-23	5	9	21	18	15	8	40	59	48	25	48	44	38	58	40	58	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A16. Meridional Winds From 26 km to 60 km at White Sands (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976

WHITE SANDS MISSILE RANGE, NM

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	1	0	1	1	1	1	0	0	1	3	3	5	4	5	6	5	2	4
STDV	30	29	33	33	41	37	51	46	55	47	63	71	70	81	99	108	130	149
N	50	55	58	58	58	58	58	58	58	58	58	58	58	58	58	54	51	49
28	-52 **																	
30	-22	6																
32	15	-26	3															
34	-10	20	3	16														
36	-10	-13	7	-18	29													
38	20	-20	10	2	-36	-20												
40	17	-23	4	27	1	-51	11											
42	44	-27	-17	25	6	-8	-16	17										
44	33	-4	10	9	28	27	-6	-11	46									
46	11	31	-9	4	41	13	4	-15	11	29								
48	-9	29	15	4	4	24	1	-14	-8	-3	50							
50	19	-6	-1	24	5	18	11	-22	21	-16	28	48						
52	-12	-4	-3	34	9	18	1	-16	-3	-9	-19	3	35					
54	27	-15	-24	22	-2	6	10	2	32	3	16	-12	30	33				
56	-3	5	18	15	14	2	-11	-6	-4	11	5	-3	-2	15	34			
58	-24	0	9	11	34	16	-32	-8	-33	-3	-1	6	-14	-1	-25	39		
60	-29	-5	24	-7	-11	19	-14	-10	-28	-12	-45	-10	-26	12	-36	-6	23	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A16. Meridional Winds From 26 km to 60 km at White Sands (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976
WHITE SANDS MISSILE RANGE, NM
NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	0	1	2	3	4	3	3	1	1	4	0	8	9	9	9	9	8	8
STDV	29	37	31	46	49	47	62	58	66	69	68	91	94	85	113	118	131	131
N	51	56	57	58	58	58	58	58	58	58	58	58	58	58	58	55	51	51
26	33	**																
28	39	42																
30	27	45	13															
32	11	32	24	47														
34	25	43	21	27	48													
36	8	24	3	33	48	43												
38																		
40	4	29	-1	45	51	39	60											
42	-3	38	10	54	38	29	32	57										
44	1	20	12	36	36	46	25	47	54									
46	1	9	6	36	55	46	45	40	46	70								
48	1	30	23	39	48	57	47	49	51	70	75							
50	12	39	23	49	58	51	48	45	45	61	58	77						
52	-9	16	11	41	66	43	53	44	38	44	46	49	66					
54	-14	10	14	29	53	44	51	33	24	42	31	43	65	76				
56	0	25	6	32	64	44	56	48	33	41	42	56	67	61	81			
58	-10	11	14	28	59	43	54	43	32	45	45	54	61	68	79	84		
60	-19	12	2	22	47	45	50	38	46	48	59	65	58	51	53	73	76	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A17. Zonal Winds From 26 km to 60 km at Primrose Lake

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976

PRIMROSE LAKE, ALBERTA

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	6	8	10	14	10	12	15	15	23	31	31	34	35	39	38	37	42	40
STDV	283	282	295	275	293	291	290	307	343	341	377	425	479	446	474	443	402	329
N	22	22	24	24	24	24	24	24	24	24	24	24	24	24	24	23	23	15
28	98	**																
30	97	94																
32	92	95	98															
34	86	94	95	97														
36	81	86	91	94	97													
38	68	73	82	86	92	97												
40	51	59	69	73	83	90	95											
42	35	40	55	62	73	82	84	96										
44	19	21	40	48	59	68	77	85	91									
46	1	3	21	28	45	53	66	78	88	88								
48	-14	-10	7	13	28	39	53	65	77	76	96							
50	-17	-7	10	16	31	40	53	65	76	70	93	98						
52	-25	-21	-6	0	14	25	41	54	67	61	86	96	97					
54	-20	-15	-2	4	19	34	42	53	65	54	83	92	95	97				
56	-24	-20	-4	2	19	29	43	54	68	63	86	93	95	97	95			
58	-34	-29	-10	-4	10	22	36	49	63	52	78	86	89	93	94	96		
60	-34	-28	-16	-10	2	15	33	46	55	40	69	77	78	85	85	86	94	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A17. Zonal Winds From 26 km to 60 km at Primrose Lake (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976

PRIMROSE LAKE, ALBERTA

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-4	-4	-5	-5	-3	-2	0	2	4	5	8	8	8	8	6	5	5	6
STDV	62	75	80	93	114	109	125	151	167	186	163	187	187	168	202	214	216	242
N	30	31	30	31	31	31	31	31	31	31	31	31	31	31	31	30	28	24
28	88	**																
30	85	85																
32	83	90	94															
34	79	87	89	94														
36	80	83	89	92	93													
38	65	69	74	80	88	90												
40	51	61	67	75	83	83	95											
42	48	57	61	70	76	80	89	94										
44	45	50	52	64	71	75	88	91	96									
46	44	52	49	62	67	72	84	87	93	95								
48	39	41	44	57	63	68	83	87	90	96	94							
50	43	44	44	56	61	68	83	84	88	92	94	96						
52	42	37	34	46	52	60	77	77	84	88	90	89	95					
54	21	25	16	32	40	47	67	70	78	83	85	83	86	93				
56	24	28	19	35	39	49	68	74	79	83	88	83	89	93	92			
58	25	31	19	39	43	50	70	76	80	87	90	88	88	90	94	93		
60	26	21	9	27	33	38	60	62	70	79	81	80	84	87	88	89	93	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A17. Zonal Winds From 26km to 60 km at Primrose Lake (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976

PRIMROSE LAKE, ALBERTA

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	6	10	11	14	16	21	24	29	32	36	41	41	40	43	44	40	43	40
STDV	67	73	83	91	99	112	102	116	125	141	134	133	150	175	180	170	211	183
N	35	35	35	35	35	35	34	35	35	35	35	35	35	35	35	33	31	27
28	88	**																
30	86	91																
32	86	88	91															
34	79	86	91	95														
36	72	81	86	87	90													
38	67	72	80	84	87	89												
40	44	50	59	66	73	74	86											
42	43	61	60	70	78	80	85	87										
44	32	45	51	60	66	72	81	85	87									
46	10	24	28	39	45	53	64	68	73	79								
48	8	19	27	35	43	54	67	71	72	80	91							
50	6	16	19	27	31	47	51	54	63	69	80	85						
52	12	18	14	29	30	44	48	55	64	62	61	68	85					
54	-2	5	-3	15	16	30	30	36	49	50	56	60	79	87				
56	-14	-17	-23	-11	-13	-5	3	-4	3	17	41	43	57	65	77			
58	-8	-7	-16	-2	4	10	19	21	28	33	42	48	67	76	86	87		
60	-21	-17	-29	-25	-19	-12	-2	-5	9	13	27	42	52	62	70	79	84	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A18. Meridional Winds From 26 km to 60 km at Primrose Lake

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976

PRIMROSE LAKE, ALBERTA

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-19	-19	-22	-24	-24	-21	-23	-22	-18	-20	-22	-14	-9	-6	-4	-1	4	1
STDV	155	168	220	241	255	261	295	291	319	333	297	276	279	300	293	259	215	176
N	22	22	24	24	24	24	24	24	24	24	24	24	24	24	24	23	20	15
28	96	**																
30	94	97																
32	90	94	98															
34	85	88	95	97														
36	77	84	91	93	97													
38	66	77	85	88	93	95												
40	61	71	81	85	88	94	96											
42	43	51	67	74	83	88	90	92										
44	55	63	76	80	89	91	92	90	95									
46	57	60	72	77	84	86	88	84	90	96								
48	41	46	57	61	68	73	73	72	80	84	88							
50	19	23	39	45	53	60	60	58	69	69	72	91						
52	3	6	28	38	48	56	60	57	70	67	70	82	93					
54	-9	-5	19	30	41	50	59	60	71	64	66	72	74	91				
56	-8	-7	9	19	32	40	46	50	66	64	68	69	67	77	89			
58	-19	-20	-12	-6	11	20	22	31	57	54	59	63	61	66	75	86		
60	-29	-36	-16	-12	9	14	23	25	45	46	55	55	55	64	79	84	86	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A18. Meridional Winds From 26 km to 60 km at Primrose Lake (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976
PRIMROSE LAKE, ALBERTA
NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-1	-1	0	2	0	1	2	0	0	2	4	4	4	3	5	8	6	13
STDV	44	63	66	68	78	69	76	76	76	64	77	71	68	78	92	91	95	132
N	30	31	30	31	31	31	31	31	31	31	31	31	31	31	31	30	28	24
26	77	**																
28	78	88																
30	81	84	93															
32	81	83	91	92														
34	73	74	81	84	90													
36	51	64	74	66	77	75												
38	63	69	78	73	81	81	80											
40	58	66	70	69	73	76	64	83										
42	51	43	46	43	53	53	46	71	77									
44	33	37	41	41	53	51	67	74	65	62								
46	39	38	30	30	39	40	46	61	54	52	68							
48	31	23	23	24	30	33	49	63	53	51	74	69						
50	9	29	26	13	28	27	52	59	54	59	69	55	60					
52	23	12	18	13	26	29	36	48	47	54	47	52	53	52				
54	8	15	21	14	24	18	48	44	46	47	54	53	40	45	63			
56	5	4	14	5	19	24	42	50	47	58	54	42	49	64	74	61		
58	-11	11	14	-8	10	15	40	47	52	42	45	20	39	77	59	36	78	
60																		

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A18. Meridional Winds From 26 km to 60 km at Primrose Lake (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976

PRIMROSE LAKE, ALBERTA

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-3	-5	-5	-5	-6	-5	-4	-4	-3	-3	-3	-2	2	1	2	4	5	4
STDV	71	82	83	89	90	90	95	102	98	93	97	104	114	141	155	182	128	142
N	35	35	35	35	35	35	34	35	35	35	35	35	35	35	35	33	31	27
28	87	**																
30	90	91																
32	84	85	93															
34	76	82	88	91														
36	72	75	81	88	92													
38	62	57	75	82	87	81												
40	59	63	74	74	81	79	85											
42	58	52	65	65	72	72	73	77										
44	63	56	71	70	77	78	72	77	77									
46	45	45	54	52	67	64	64	72	71	83								
48	11	5	16	24	31	45	47	52	51	51	57							
50	14	7	19	27	40	48	54	53	55	61	66	76						
52	19	16	32	27	42	38	52	57	57	62	66	54	77					
54	18	17	24	17	28	30	27	38	42	46	66	47	61	74				
56	12	9	20	16	17	27	24	36	31	46	57	55	59	66	82			
58	31	30	35	29	35	32	42	39	32	36	39	18	41	53	61	43		
60	-1	-7	-2	-6	2	1	10	13	16	18	34	6	32	46	54	46	65	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A19. Zonal Winds From 26 km to 60 km at Poker Flats

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976

POKER FLATS, AK

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL

MEAN AVERAGE OF OBSERVED VALUES

STDV STANDARD DEVIATION OF VALUES TIMES 10

N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	18	21	21	23	23	23	26	26	24	26	26	28	28	23	23	20	20	21
STDV	242	263	283	298	316	325	344	353	347	352	339	348	370	353	355	352	338	390
N	37	41	43	45	44	43	45	44	42	44	44	44	43	41	42	41	34	21
26	99	**																
30	97	99																
32	97	97	98															
34	95	96	96	99														
36	94	95	96	98	99													
38	92	93	93	96	98	99												
40	89	91	92	96	96	99	99											
42	82	86	89	91	93	95	95	96										
44	70	73	79	85	87	89	90	92	96									
46	68	72	77	80	83	87	88	88	94	96								
48	55	59	64	70	73	77	79	79	85	89	96							
50	37	43	53	59	62	66	70	72	77	84	90	96						
52	30	39	49	53	55	61	62	65	76	78	87	87	93					
54	31	33	47	51	56	60	62	65	71	79	80	81	88	93				
56	25	24	39	39	45	48	48	52	60	65	68	68	77	82	91			
58	20	14	30	30	32	37	37	40	52	49	57	60	65	68	77	91		
60	34	27	48	56	52	58	57	60	62	57	61	64	66	68	76	87	97	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A19. Zonal Winds From 26 km to 60 km at Poker Flats (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 196,-1976

POKER FLATS, AK

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-4	-5	-6	-6	-7	-6	-6	-5	-3	-2	1	0	2	2	3	2	-1	-2
STDV	44	50	64	66	81	99	103	110	128	135	139	150	147	147	147	143	161	163
N	40	40	40	40	40	39	38	39	38	38	38	37	38	38	36	35	30	22
28	82	**																
30	57	80																
32	55	77	90															
34	43	70	80	90														
36	43	68	83	88	90													
38	45	71	84	88	90	94												
40	41	70	79	86	86	91	94											
42	34	57	68	77	80	85	89	91										
44	33	57	79	81	83	86	90	92	93									
46	25	46	64	71	75	87	84	86	90	89								
48	27	50	65	71	73	84	82	81	87	87	92							
50	23	46	67	67	68	80	86	82	92	84	91	90						
52	30	54	62	62	59	69	75	77	84	80	84	76	88					
54	16	35	41	49	48	62	64	68	76	74	79	78	82	84				
56	16	33	38	48	52	57	65	68	77	76	69	76	61	75	88			
58	24	22	45	45	53	51	60	55	70	76	68	58	76	68	57	75		
60	4	15	44	50	61	63	66	64	81	82	80	75	86	82	78	74	90	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A19. Zonal Winds From 26 km to 60 km at Poker Flats (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976

POKER FLATS, AK

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-7	-9	-9	-11	-12	-13	-14	-15	-17	-20	-22	-23	-26	-30	-31	-37	-42	-41
STDV	24	39	29	37	37	28	37	49	61	68	64	56	63	74	90	81	101	99
N	36	36	36	37	37	37	37	35	36	36	36	36	36	36	35	30	26	19
26	78	**																
28	35	69																
30	19	13	17															
32	31	24	10	66														
34	30	27	25	50	77													
36	31	21	20	41	56	61												
38	21	13	12	63	75	61	64											
40	23	13	-4	61	82	69	51	79										
42	21	4	18	61	80	72	62	82	52									
44	35	34	47	45	63	60	60	68	64	78								
46	24	31	40	48	51	60	69	71	50	60	73							
48	34	11	6	40	50	55	56	59	47	49	49	58						
50	9	0	-5	22	25	19	44	31	26	26	16	37	60					
52	5	15	27	29	32	20	13	43	33	30	27	26	11	30				
54	-9	-5	-11	55	43	25	42	60	44	37	16	25	30	49	62			
56	-1	13	10	61	50	47	55	59	52	39	34	39	34	36	47	78		
58	35	21	-6	42	24	24	28	19	33	20	13	16	18	37	32	56	77	
60																		

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A19. Zonal Winds From 26 km to 60 km at Poker Flats (Cont)

CORRELATION AT PAIRS OF LEVELS FOR OCT 1969-1976

POKER FLATS, AK

EAST-WEST WIND M/SEC WEST +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	13	15	17	18	19	21	22	25	29	30	32	33	32	31	31	31	31	26
STDV	95	99	109	109	112	108	119	128	122	117	135	149	157	168	186	207	215	169
N	28	28	29	29	29	29	29	29	29	28	28	28	27	27	26	27	21	16
28	97	**																
30	95	97																
32	91	93	96															
34	91	93	96	97														
36	86	88	91	93	95													
38	83	90	90	90	91	95												
40	85	90	90	88	90	90	95											
42	79	83	88	86	87	86	90	95										
44	72	82	81	80	84	83	93	91	89									
46	64	74	77	78	79	81	87	89	86	89								
48	52	61	67	69	70	66	73	75	76	79	89							
50	40	55	58	60	61	60	72	74	74	81	90	92						
52	25	38	39	39	38	46	55	59	62	66	70	65	80					
54	24	34	37	40	36	40	42	50	53	55	63	64	72	84				
56	19	24	33	42	37	39	41	51	54	52	57	64	64	69	82			
58	4	5	26	35	26	27	21	33	45	23	54	55	45	48	63	87		
60	9	15	26	22	14	0	15	32	37	17	53	59	57	27	10	30	70	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A20. Meridional Winds From 26 km to 60 km at Poker Flats

CORRELATION AT PAIRS OF LEVELS FOR JAN 1969-1976

POKER FLATS, AK

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-10	-14	-17	-18	-21	-25	-26	-28	-31	-31	-29	-30	-26	-20	-16	-15	-9	-4
STDV	130	161	195	196	225	247	281	303	341	374	406	431	390	366	325	321	361	342
N	37	41	43	45	44	43	45	44	42	44	44	44	43	41	42	41	33	21
28	96	**																
30	92	97																
32	90	94	96															
34	85	89	94	97														
36	73	81	88	90	97													
38	61	72	81	83	88	94												
40	50	64	74	77	85	92	95											
42	44	54	65	71	81	89	90	96										
44	32	46	57	62	75	84	85	93	98									
46	24	39	52	57	70	80	81	90	95	97								
48	12	27	43	48	61	71	75	86	92	96	97							
50	8	19	35	41	54	63	67	77	84	89	91	96						
52	-1	7	27	29	43	53	56	66	75	79	84	88	96					
54	-16	-5	19	24	37	47	52	62	69	74	77	82	89	94				
56	-20	-10	12	19	28	37	44	52	61	63	66	70	81	87	94			
58	-24	-17	5	9	19	29	37	44	54	57	58	65	78	83	87	93		
60	-35	-32	-1	-2	3	5	8	28	27	36	46	56	72	78	86	85	86	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A20. Meridional Winds From 26 km to 60 km at Poker Flats (Cont)

CORRELATION AT PAIRS OF LEVELS FOR APR 1969-1976

POKER FLATS, AK

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	1	1	1	1	1	1	0	1	2	2	2	2	4	4	5	6	6	8
STDV	46	41	39	45	47	67	69	81	85	89	92	104	131	124	125	103	96	108
N	40	40	40	40	40	39	38	39	38	38	36	37	38	38	36	35	30	22
28	71	**																
30	65	78																
32	53	64	80															
34	46	52	70	89														
36	46	60	75	87	83													
38	32	58	75	76	77	81												
40	21	51	72	62	57	69	87											
42	14	43	57	67	64	74	75	74										
44	14	43	66	70	55	71	78	86	85									
46	22	36	56	60	48	59	64	73	75	76								
48	19	33	47	40	30	59	77	69	78	80	80							
50	27	47	61	55	42	64	77	73	77	77	63	87						
52	17	39	54	44	33	61	76	76	81	75	77	89	89					
54	4	26	40	36	22	44	62	64	75	70	77	85	79	90				
56	-7	9	24	32	19	38	47	52	68	64	67	79	70	81	78			
58	17	20	32	29	26	40	34	38	51	55	48	52	49	47	41	64		
60	19	21	43	50	43	70	46	56	59	69	72	77	47	64	63	69	80	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A20. Meridional Winds From 26 km to 60 km at Poker Flats (Cont)

CORRELATION AT PAIRS OF LEVELS FOR JUL 1969-1976

POKER FLATS, AK

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	3	1	1	1	1	2	2	2	2	2	3	3	4	6	6	6	7	7
STDV	14	16	15	16	21	19	21	27	27	32	32	35	44	53	45	52	73	65
N	39	36	36	37	37	37	37	39	36	36	36	36	36	36	35	30	26	19
28	35	**																
30	30	-4																
32	29	14	-25															
34	32	-28	-14	-19														
36	35	-12	-1	-17	24													
38	36	8	4	20	7	16												
40	-15	-18	12	4	-14	-11	17											
42	10	29	-5	13	-35	32	-13	9										
44	63	-12	8	11	-15	30	20	-18	0									
46	26	10	-21	15	12	13	45	19	-9	24								
48	28	-6	24	41	21	9	20	19	7	7	28							
50	-7	-37	4	-9	9	29	-17	28	6	7	12	37						
52	9	-16	42	-29	-17	21	5	-7	-14	19	-18	0	35					
54	-17	-43	-4	-14	6	17	-16	-34	-36	-5	-18	10	10	-16				
56	-11	-23	-7	1	10	-4	-13	-41	-37	-5	-13	-16	-23	-32	52			
58	32	-38	-7	3	34	5	19	5	-13	-5	-15	18	9	2	37	20		
60	10	-25	-37	21	-40	-16	3	24	19	52	11	-18	9	34	-8	-14	-11	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Table A20. Meridional Winds From 26 km to 60 km at Poker Flats (Cont)

COI· ELATION AT PAIRS OF LEVELS FOR OCT 1969-1976

POKER FLATS, AK

NORTH-SOUTH WIND M/SEC SOUTH +

KM KILOMETERS ABOVE SEA LEVEL
MEAN AVERAGE OF OBSERVED VALUES
STDV STANDARD DEVIATION OF VALUES TIMES 10
N NUMBER OF VALUES AT EACH ALTITUDE

KM	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
MEAN	-3	-5	-8	-9	-12	-13	-15	-16	-18	-19	-22	-22	-22	-22	-16	-15	-13	-12
STDV	66	77	91	104	104	114	116	129	129	129	143	169	197	202	213	216	201	215
N	28	28	29	29	29	29	29	29	29	28	28	25	26	27	26	26	21	16
28	92	**																
30	87	94																
32	84	89	97															
34	73	77	87	93														
36	69	76	83	89	93													
38	65	73	76	80	85	91												
40	55	72	76	78	78	83	90											
42	51	67	73	76	79	84	83	94										
44	51	61	64	66	75	79	76	86	91									
46	50	62	59	60	65	71	76	82	86	93								
48	44	62	57	54	60	60	68	80	79	84	88							
50	50	66	63	57	60	63	69	79	76	80	83	95						
52	22	40	44	41	48	52	54	74	75	76	74	81	84					
54	20	31	15	14	21	22	29	48	46	61	66	66	68	76				
56	9	25	26	24	32	40	38	56	57	65	66	62	69	86	90			
58	24	34	24	22	42	52	53	45	47	53	60	60	64	72	65	81		
60	43	41	39	44	56	55	50	48	61	70	74	71	68	74	72	68	72	

** MULTIPLY TABULAR VALUES BY 0.01 TO OBTAIN CORRELATION COEFFICIENTS

Appendix B

Sample Calculations for Estimating the Effects of Winds on a Reentry Vehicle

The computations given in this Appendix illustrate how to estimate the effect of mean monthly zonal and meridional winds, and the day-to-day variations around their means, on the trajectory of a reentry vehicle passing through the region between 11 km and 5 km near Wallops Island in January.

For the purpose of this simplified example, the following influence coefficients for the vehicle have been assumed such that a wind of 1 m sec^{-1} at a specific altitude will have the indicated effect through a 2-km layer of the atmosphere:

Layer (km)	Influence [m(m sec^{-1})$^{-1}$]
11 — 9	0.7
9 — 7	0.4
7 — 5	0.2

The average departure from a no-wind condition is the sum of the effects due to the mean monthly wind speed at each level as determined from Eq. (2) in Section 3 of the text:

Level (km)	Wallops Zonal Wind (m sec^{-1})		Influence [m(m sec^{-1})$^{-1}$]		Distance (m)
10	31	×	0.7	=	22
8	34	×	0.4	=	14
6	28	×	0.2	=	6
	Average departure due to zonal wind			=	42 m

Level (km)	Wallops Merid. Wind (m sec^{-1})		Influence [m(m sec^{-1})$^{-1}$]		Distance (m)
10	2	×	0.7	=	1
8	2	×	0.4	=	1
6	1	×	0.2	=	0
	Average departure due to merid. wind				2 m

Consequently, the average range and cross-range distance from a no-wind condition is 42* meters to the east and 2* meters to the north.

The integrated standard deviation of the departure due to day-to-day variations in the component wind profiles is determined from Eq. (3) in Section 3 using the standard deviations of the component winds at levels 10, 8, and 6 km and the correlation coefficients between these levels as indicated in the zonal and meridional arrays for Wallops Island, January, in Appendix A:

Zonal Wind

Corr Coeff		Std Dev (m sec^{-1})	Influence [m(m sec^{-1})$^{-1}$]	Std Dev (m sec^{-1})		Influence [m(m sec^{-1})$^{-1}$]		Distance^2 (m^2)
		$(12.0 \times 0.7)^2$					=	71
		$(15.0 \times 0.4)^2$					=	36
		$(12.3 \times 0.2)^2$					=	6
2×0.91	×	12.0×0.7	×	15.0	×	0.4	=	92
2×0.77	×	12.0×0.7	×	12.3	×	0.2	=	32
2×0.94	×	15.0×0.4	×	12.3	×	0.2	=	28
						Total (σ_2^2)	=	265 m^2

Meridional Wind

Corr Coeff		Std Dev (m sec^{-1})		Influence [m(m sec^{-1})$^{-1}$]	Std Dev (m sec^{-1})		Influence [m(m sec^{-1})$^{-1}$]		Distance^2 (m^2)
		$(19.2 \times 0.7)^2$						=	181
		$(16.4 \times 0.4)^2$						=	43
		$(13.4 \times 0.2)^2$						=	7
2×0.97	$\times$	19.2×0.7		X	16.4	$\times$	0.4	=	171
2×0.90	$\times$	19.2×0.7		$\times$	13.4	$\times$	0.2	=	37
2×0.95	$\times$	16.4×0.4		$\times$	13.4	$\times$	0.2	=	33
							Total (σ_m^2)	=	472 m^2

Thus, the integrated standard deviation (σ) is

$$\sigma = \sqrt{(\sigma_z^2) + (\sigma_m^2)} = 27 \text{ m} \qquad \text{(B1)}$$

Based on the assumption of circular distribution of winds, the vehicle will impact within 47 meters* (1.73 σ) of the target 95 percent of the time, provided the aim point has been adjusted to compensate for the mean monthly wind. The CEP (the circle within which 50 percent of the missile hits (0.83 σ) will be scattered) is 20 meters.*

*These values reflect both smaller mean monthly effects and variability around the target than would normally be expected because the sample calculations have been made only for altitudes between 11 km and 5 km.